Statewide Rural Transit Intelligent Transportation Systems Deployment

Procurement Specifications

EXHIBIT A

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LIST OF ABBREVIATIONS AND ACRONYMS

ABD	As-Built Document
ADA	American with Disability Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AIL	Action Items List
ATP	Acceptance Test Procedures
BT	Burn-In Testing
CAD/AVL	Computer Aided Dispatch/Automatic Vehicle Location
CGCTA	Cape Girardeau County Transit Authority
DRD	Design Review Documentation
EPS	Electronic Payment System
FT	Factory Testing
GIS	Geographical Information System
GPS	Global Positioning System
IDD	Installation Design Documentation
IT	Installation Testing
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
LAN	Local Area Network
MDT	Mobile Data Terminal
MoDOT	Missouri Department of Transportation
NTCIP	National Transportation Communications Interface Protocols
NTP	Notice To Proceed
ODBC	Open Database Connectivity
PRTT	Priority Request To Talk
RM	Requirements Matrix
RR	Requirements Review
RTT	Request To Talk
SA	System Acceptance
SEMO	Southeast Missouri State University
SIP	System Implementation Plan
SM	Systems Manuals
SMTS	Southeast Missouri Transportation Service
ST	System Testing
TP	Training Plan
TRD	Test Results Documentation
UM	User Manuals
VAN	Vehicle Area Network
VLU	Vehicle Logic Unit
WAAS	Wide Area Augmentation System
WLAN	Wireless Local Area Network

1 Introduction

The purpose of this document is to specify intelligent transportation systems (ITS) hardware and software that will be procured by Missouri Department of Transportation (MoDOT), and deployed and maintained by participating Missouri transit provider agencies. The hardware and software discussed herein is intended to provide the transit providers' staff with better fleet and service information while helping operators and managers operate the system more efficiently. Further, the hardware and software will ensure better and more timely information for the customers.

1.1 Participating Transit Agencies

The three participating transit agencies are expected to be Cape Girardeau County Transit Authority (CGCTA), OATS, and Southeast Missouri Transportation Service (SMTS). Between OATS and SMTS, rural transit in nearly every county is included. The inclusion of CGCTA, acting in collaboration with Southeast Missouri University (SEMO), helps extend the initial deployment to address small urban transit agencies as well. The intent is to enable the potential expansion of the initial procurement to additional participating transit agencies in Missouri within a reasonable negotiated period, based on the results of the initial deployment.

The following is a brief description of each of the three agencies that are expected to initially participate:

GCCTA is a quasi-governmental agency that provides service to all of Cape Girardeau County, Missouri (total area is 586 sq. miles and total population is about 70,000). In addition, GCCTA provides long-distance medical and courier service within a 150 mile radius. The agency operates fixed route, demand response, paratransit, courier and contracted services. Cape Girardeau County Transit has a fleet of 32 vehicles and a staff of 52 and annual budget for 2007 is $1.3 million. Fixed route service runs from 6:00 am till 6:00 pm while demand response service runs 24 hours a day, seven days a week. GCCTA fixed-route service is a recent service that started in middle of 2006. The first six months of service provided a total of 13,000 trips and this number is expected to keep increasing as more residents become aware of the service. GCCTA is expected to participate in collaboration with deployment for a limited functionality version of the system in support of vehicle tracking on fixed route campus shuttle services offered in the City by SEMO

OATS is a private not-for-profit transportation service provider and the second largest Missouri transit provider by fleet size. OATS provides personalized advance reservation and demand response transportation services to senior citizens and persons with disabilities as well as to the general public in rural areas, on a space available basis. The organization has been in operation since 1971. OATS transportation services are available in 87 of Missouri's 114 counties. The 16-member volunteer Board of Directors governs the organization. Company-wide, OATS provides transportation services to over 28,000 unduplicated persons annually. Its statewide fleet of over 600 vehicles traveled more than 12.8 million miles in 2006 and provided nearly 1.5 million one-way trips. OATS' 87-county service area is divided into seven regions (see also Figure 1). Each region covers anywhere from four counties to as many as 18 counties. OATS headquarters are in Columbia. However, each region has its own satellite office which is supervised by a director and other administrative staff. Headquarters is responsible for accounts payable/receivable, tracking miles and hours of service, invoicing, and payroll.
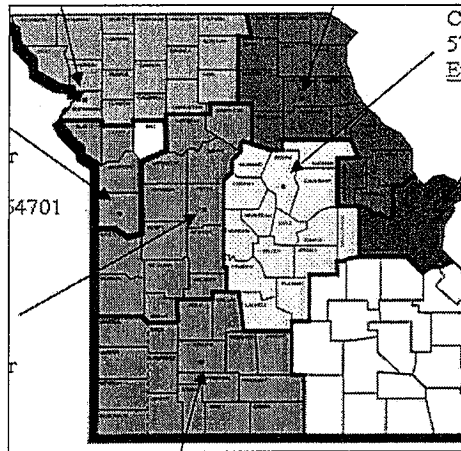
Figure 1. OATS Service Area

SMTS is a non-profit corporation originally organized under Missouri Law in 1973. SMTS provides service in 21 counties in southeast Missouri (see Figure 2). SMTS provides local service, long distance medical service and contracts to provide other service. Long distance medical service includes trips to major medical facilities in St. Louis, Cape Girardeau and Springfield in Missouri; Memphis, Tennessee; and Paragould, Arkansas. SMTS provides transportation for groups and organizations on a contract basis. These groups include sheltered workshops, dialysis transportation, women's programs, prisoner family transportation and many others. SMTS has a staff of about 140 and runs a fleet of 116 vehicles.
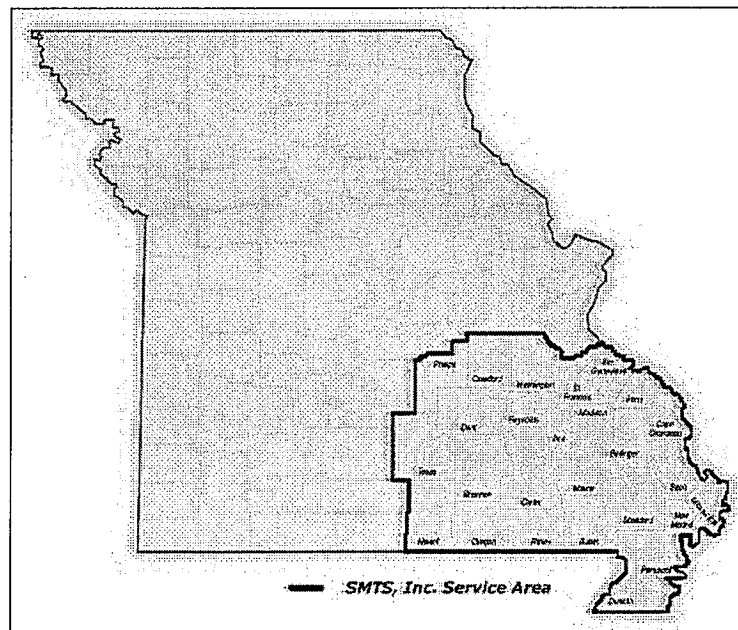
Figure 2. SMTS Service Area

2   Overview

These functional specifications reflect the specific needs of the participating agencies. The following is a brief summary of the proposed deployment for each agency. The references to phases refer to a staged rollout of the technologies procured.

OATS: OATS is interested in pursuing the following deployment sequence:

- Phase 1:
    - o Demand response CAD/AVL operations management system, including
        - scheduling/dispatch/AVL software
        - mobile data communications
        - MDTs with integrated smart card reader
        - operator management software
        - timekeeping software
    - o Maintenance management software
- Phase 2:
    - o Smart card system with management software, for
        - client trip verification
        - stored value fare payment
    - o Backup warning system
    - o Driving event recorder
- Phase 3:
    - o Web interface
        - trip scheduling
        - trip confirmation and cancellation
    - o IVR interface
        - trip confirmation and cancellation
        - automated dial out for trip reminders day before and as vehicle approaches

The demand response CAD/AVL operations management system will be generally configured as follows:

- Each of the seven regions will have a local server, for system access by call-takers, schedulers and dispatchers
- The regional systems will support remote thin client access (e.g., web services, Citrix), allowing server access from existing workstations at locations outside the regional office Local Area Network (in particular for subregion offices). This remote access approach is expected to apply to at minimum:
    - o NW Region with 3 subregion sites
    - o NE Region with 2 subregion sites
    - o E Region with 2 subregion sites
- Regional server databases will be frequently synchronized with a data repository at OATS Headquarters, serve as a backup data repository for each region. OATS will also likely implement data warehousing and reporting tools for enhanced use of this data repository, outside the scope of this procurement.
- The Mid-MO regional system (being the one located closest to Headquarters Information Technology support staff) will be configured with a higher level of hardware capability and redundancy, so that it can serve as a backup operations site for the other regional systems

The rollout sequence will involve an initial trial implementation in one region followed by subsequent rollouts at the remaining regions. For each region, there would be the option of an initial period of software-only operation, prior to adding the MDTs.

East Region vehicles that provide coordination trips for Metro in St. Louis will continue to operate on the Metro Trapeze PASS system as they do today. For the East Region only, Metro indicates that their recently upgraded software will enable an interface to the new OATS system, providing OATS with up to date information for consolidated reporting on trips provide by OATS to Metro (e.g., daily export to OATS of completed OATS-provided trips). Also, OATS will be able to continue as they do today in using their remote access to the Metro PASS software to schedule additional non-Metro trips on these vehicles. The vendor for the new OATS system will be made responsible for implementing the interface to the existing Metro PASS system. Specifically, this is expected to involve a script that periodically imports daily the trip data exported from the Metro Trapeze PASS database. Metro will arrange for the necessary support from Trapeze to enable this approach, with Trapeze providing access and a data dictionary for their database (or more likely given their proprietary interest in their database, providing access and a data dictionary for a view they would create for the necessary data).

Metro is also interested in seeing OATS under this project equip those OATS vehicles that would continue to operate with the Metro PASS software, with whatever new MDT is being implemented elsewhere in the OATS fleet. This would be contingent on Metro being able to arrange with their system providers (i.e., Trapeze, Mentor and the radio data communications vendors) to support this MDT. The specific MDT involved will only become known subsequent to the statewide procurement process that selects the vendors for the new OATS system, so Metro would not be able to establish this compatibility now. The procurement will include an option to purchase additional MDT's for the East region to be compatible with the OATS procured software, which would be supplied and installed on these vehicles only if OATS chooses to exercise the option. In this manner, the determination as to whether OATS should install these Metro compatible MDT's (and Metro enable them to work with the Metro system) can be made once the OATS contract has been awarded.

SMTS: SMTS is interested in pursuing the following deployment sequence:
- Phase 1:
    - Demand response CAD/AVL operations management system, including
        - scheduling/dispatch/AVL software
        - mobile data communications
        - operator management software
        - timekeeping software
    - Maintenance management software

The demand response CAD/AVL operations management system will be generally configured as follows:

- SMTS HQ will have the server, for system access by call-takers, schedulers and dispatchers
- A workstation installed at the Poplar Bluff facility will support remote thin client access (e.g., web services, Citrix) for call-taking.
- SMTS intends to equip all vehicles with the onboard system equipment.

SMTS is interested in exploring the potential to be a third party remote user of the software, and would consider paying an ongoing fee for such a service. Possibilities include being a remote user of the OATS system or of a hosted service offered by the vendor.

SMTS is also interested in configuring the system to provide manifests to operators in advance of the current operating day. This would allow the MDT alone to support HQ needs for advance communications with autonomous operators (e.g., so that they can confirm trips with riders the day before, so that they can know the time of their first trip the following day).

The CAD/AVL/MDT system shall also allow drivers to log in with different codes (e.g., reflecting whether the driver is running service, going to maintenance, going to fuel the vehicle), configured to provide timekeeping data.

GCCTA/SEMO: GCCTA is interested in implementing the following:
- Phase 1:
    - Demand response CAD/AVL operations management system (with full support for the demand response operation vehicles and AVL-only support for the fixed route vehicles), including
        - scheduling/dispatch/AVL software
        - mobile data communications
        - MDTs, including taxi meter functionality supporting location-based and shared ride fares

SEMO is interesting in implementing the following in collaboration with the GCCTA deployment:

- Phase 1:
    - AVL-only system for its fixed route shuttle buses, including
        - AVL software
        - mobile data communications
        - GPS receivers
    - Maintenance management software
- Phase 2:
    - Driving event recorder

GCCTA and SEMO coordinate their services, and would seek to be able to view locations for each other's vehicles as well as their own. Both GCCTA and SEMO are interested in exploring the potential to be third party remote users of the software, and would consider paying an ongoing fee for such a service. Possibilities include being a remote user of the OATS system or of a hosted service offered by the vendor.

Table 1 summarizes the technologies to be deployed at each of the participating agencies. Table 2 provides information on the number of onboard equipment and workstations for some of the systems to be deployed, with quantities stated by agency. The cost proposal table, provided at the end of this document, provides a more comprehensive list of equipment to be procured.

Table 1. Summary of Technologies to be Procured by Phase and by Agency

Technology	OATS	SMTS	CGCTA	SEMO
Phase 1:				
Scheduling/dispatch/AVL software	Yes	Yes	Yes	Yes
Mobile data communications	Yes	Yes	Yes	Yes
MDTs		Yes		Yes
MDTs with future integrated smart card reader	Yes			
MDTs with taxi meter functionality			Yes	
Operator management software	Yes	Yes		
Timekeeping software	Yes	Yes		
Maintenance management software	Yes	Yes		Yes
Phase 2:				
Smart card system with management software	Yes			
Backup warning system	Yes			
Driving event recorder	Yes			Yes
Phase 3:				
Web interface	Yes			
IVR interface	Yes			

Table 2. Number of Units for Selected Systems to be Deployed by Agency

System	Equipment	Quantity			
		OATS	SMTS	CGCTA	SEMO
CAD/AVL					
MDTs and mobile cell data modems	Vehicles	258	119	23	14
Workstations	Sites	8	5	2	1
Maintenance Management Software					
Workstations	Sites	8	2	n/a	1
Collision Avoidance System					
Onboard system	Vehicles	258	n/a	n/a	n/a
Driver Event Recorder					
Onboard equipment	Vehicles	258	n/a	n/a	14
Fixed end equipment	Sites	7	n/a	n/a	1

3 General

All specification requirements stated as to be performed by the "Proposer" shall be submitted as part of the proposal.

The Proposer shall describe the planned system architecture, using a combination of descriptive text and diagrams. This architecture shall represent a fully interoperating collection of distinct systems, subsystems and components addressing the overall intent of the system described in Section 2.

Each deploying agency shall retain ownership rights to all data collected and generated by the system.

Each deploying agency shall be granted an irrevocable, perpetual and royalty-free license to use all software provided by the Contractor, whether such software is provided directly by the Contractor or by a third party.

The Contractor shall supply all hardware, software, maintenance and support agreements necessary to deliver a fully functional system as specified in the requirements.

Each deploying agency will supply the information needed for the Contractor to evaluate their current computing and networking environment. The participating agencies reserve the right to purchase computer hardware from a commercial source based on the Contractor's specifications. The Contractor shall be responsible for the installation of the computer hardware at the participating agency and for its integration with their networking environment.

Proposers shall present for review by MoDOT and each deploying agency all proposed license, maintenance and support agreements and pricing, for hardware and software provided by the Contractor and any subcontractors and vendors. MoDOT and the deploying agency may require that any of these items be subject to finalization as part of the contract finalization process.

The Contractor shall recommend and provide options for hardware and software configurations that will accommodate initial needs and growth over at least a three-year lifecycle.

All hardware, software, maintenance and support agreements must be approved by each deploying agency prior to acquisition.

The Contractor design shall accommodate changes based on MoDOT and each deploying agency standards or other factors required to ensure the compatibility with the environment and standards of the deploying agency and MoDOT.

All hardware, software, maintenance and support agreements shall be procured on behalf of each deploying agency and become the property of the deploying agency at time of installation.

All system software and firmware that maintain a date and time shall be updated at least once per day to remain consistent with the data and time of the corresponding system date and time at the agency.

Proposers shall clearly describe the data security features of the proposed systems.

Proposers shall clearly describe the backup/recovery procedures for all databases that are part of the proposed system.

Proposers shall need to be familiar with the layout and resources available at each deploying agency's dispatch center and clearly state the requirements for power, air conditioning and other resources.

Proposers shall submit examples of benefits their previous implementation sites have experienced as a result of deploying their ITS systems.

4 Data Communication

Proposers shall investigate alternatives for the mobile data communications infrastructure needed for the proposed solution. In general, the participating agencies anticipate that mobile data communications for this project will involve the use of vehicle leased cellular accounts, using cellular provider(s) selected by the agencies. Due to the geographic extent of operations with some of the participating agencies, it is possible that the system will need to enable the use of multiple cellular providers, potentially even on a particular vehicle.

Proposers shall propose one or more appropriate data communications alternatives, suited for use with their proposed solution in the local environment by each participating agency.

Proposers shall assure and describe the reliability of the proposed alternative(s) and provide reference sites where they have successfully completed similar implementations.

Proposers shall propose the infrastructure to establish the mobile data communications needed to support the operation of their proposed solution.

Proposers shall include with the price proposal form a supplementary price breakdown table for each proposed mobile data communications infrastructure alternative, including all incremental hardware, software and integration, including the cost of any leased cellular data accounts prepaid for five years.

5 On-board Systems

5.1 General

The Contractor shall be responsible for the integration of the on-board components with all other components into an overall intelligent transportation system (ITS).

5.2 MDT

5.2.1 MDT Hardware

5.2.1.1 General

The vehicle operator terminal shall be connected with or integrated into the VLU, and the combination will be subsequently referred to as the MDT.

The Contractor shall provide appropriate in-vehicle MDTs for all vehicles for each agency per Section 2 (Overview) and Table 2.

MDTs shall be housed in enclosures that cannot be opened with standard hand tools.

MDTs shall turn on automatically when the vehicle power is turned on, and shall shut down at a programmable time after the vehicle power is turned off.

All equipment modules, cables, mounting hardware and connectors shall be designed to withstand the full range of operating environments found in the areas in which they are to be installed, and shall not interfere with the operation of existing and future equipment.

Electronic data interfaces between each distinct module and subsystem shall be electrically isolated from all data input and output connectors.

All data inputs and outputs, whether serial or parallel, shall be protected against over-voltage and reverse polarity. This protection shall be designed to absorb "routine" over-voltages and reverse polarity conditions, and to open respective circuits in the event of "extraordinary" conditions, sacrificing inexpensive and easily identifiable components when necessary to protect more expensive components or those less easy to troubleshoot.

MDTs shall be designed to operate in accordance with these specifications for ambient temperatures from -22 °F to 149°F (-30°C to +65°C).

MDTs shall be designed to operate in accordance with these specifications for ambient humidity from 5% to 95%, non-condensing.

MDTs and all other on-board components shall be designed to withstand the vibration and shock forces associated with transit vehicles.

MDTs and all other on-board components shall be sealed against dust and water intrusion, certified in compliance with the NEMA 4 or IP65 standard (or better).

MDTs shall be modular, with sensitive components sealed using conformal coating qualified to MIL-I-46058C.

MDTs shall conform to FCC part 15 Class B limits for conducted and radiated emissions of electromagnetic interference.

MDTs shall be tested and proven capable of withstanding power transients and radio frequency interference without degradation at levels that are known to exist in ordinary circumstances.

Power and communications lines, and the MDT case may be exposed to electrostatic discharges from personnel, so the units shall be tested and proven resistant through testing in accordance with accepted industry procedures for testing computer equipment.

5.2.1.2   VLU

VLUs, which serve as the controlling computing device for the overall MDT, shall be capable of being locally configured and maintained using a laptop computer or other portable programming device (e.g., via an RS-232 console port). These devices may also be used for performing routine diagnostic maintenance.

5.2.1.3   Vehicle Operator Terminal

The vehicle operator display of the MDT shall use a color backlit display, readable by the vehicle operator from the seated position under the full range of ambient illumination conditions. This could be accomplished through the incorporation of such measures as vehicle operator-controlled brightness/contrast control, anti-glare coating and adjustable orientation mounting.

The vehicle operator terminal shall allow the user to adjust the speaker volume at any time while the MDT is on.

The operator terminal application software shall be operated using either at least eight programmable function keys or touch screen programmable buttons. The MDT speaker shall provide audible feedback when a function key or on-screen key is pressed. Function keys shall also provide tactile feedback when pressed.

The vehicle operator shall not be able to manually shut off or disconnect the operator terminal power or manually shut down the application software.

5.2.1.4   Integrated GPS Receiver and Antenna

The MDT shall incorporate an integrated GPS receiver.

GPS receivers shall report latitude, longitude, speed, time, direction of travel and whether the receiver has a GPS position lock.

GPS receivers shall be configurable as to the required threshold value for GPS lock given the current Horizontal Dilution of Precision.

The GPS receivers shall be parallel tracking receivers, capable of simultaneously tracking at least four GPS satellites in the best available geometry, while also serially tracking the four next best satellites and upcoming (rising) satellites.

On-board GPS receivers must be Wide Area Augmentation System (WAAS)-capable, providing position accuracy within three meters 95 percent of the time.

The GPS receiver shall have a cold start solution time of two minutes or less and a re-acquisition time of 15 seconds or less.

The GPS equipment shall include multi-path rejection capabilities to help eliminate spurious signals caused by reflections of buildings or other structures.

Velocity measurements provided by the GPS equipment shall be accurate to within 0.1 meters per second.

The GPS antenna shall be a low-profile unit housed in a rugged and weather tight enclosure. The GPS antenna shall be securely mounted on the exterior of the vehicle, clear of obstructions and interference-generating devices. GPS antenna location shall be determined in collaboration with agency staff. The antenna, mounting and sealants shall be impervious to physical and chemical attack by automatic bus washing equipment.

5.2.1.5   Interface with Existing Odometers

The MDTs shall be interfaced with the existing odometer, receiving the digital or analog signal and determining the distance traveled since the MDT was powered on.

5.2.1.6   Covert Alarm Switch

The MDTs shall be equipped with a covert alarm switch, mounted at a location approved by agency.

5.2.1.7   Installation

MDTs shall be replaceable as discrete units and identified by unique serial numbers. Each connector shall be keyed or otherwise configured so as to prevent inadvertent miswiring during MDT replacement.

Electrical power for MDTs and all other on-board components shall be drawn from vehicle unconditioned nominal power supply. All data inputs and outputs shall be designed to absorb "routine" intermittent low

voltage, over-voltage and reverse polarity conditions, and to use inexpensive and easily replaceable components to open circuits in the event of "extraordinary" conditions (e.g., through the use of fuses, transorbs, optical isolation).

MDTs shall be securely mounted in the interior of the vehicle, so as to avoid blocking vehicle operator sightlines to front and side windows. The location of and mounting method for the MDT units shall be determined in collaboration with the agency staff.

5.2.2 MDT Software

5.2.2.1   Logon and Logoff

The MDTs shall allow vehicle operator logon through entering the operator ID, route number, and dashboard odometer value.

The MDT shall allow the vehicle operator to logoff by selecting the logoff key.

The MDT shall send a message to the dispatcher as a confirmation of the vehicle operator logoff, including the accumulated odometer value.

The MDT shall periodically attempt to send a logon or logoff message until it receives an acknowledgement message from dispatch.

The MDTs shall allow vehicle operator to logon using one of multiple run numbers to indicate if the operator is logging on to run service, take vehicle for maintenance, take vehicle for fueling. The specific run numbers shall be configurable by the participating agencies.

5.2.2.2   Location Reporting

The MDT shall send a location report, indicating its current GPS location and odometer value, once a programmable number of minutes have passed since the previous location report.

All transmitted data shall be stamped with following information: date and time, GPS location latitude and longitude, vehicle number, vehicle operator ID number, block number, run number, trip number, and odometer value.

The MDT shall store the most recent location received from the GPS receiver, so that if the GPS receiver is not able to report the location, the last known location will remain available.

The GPS location indicated in a report sent by an MDT to dispatch shall indicate whether the location is the current location from the GPS receiver or the last known GPS location.

5.2.2.3   Manifest Display

Manifests and manifest updates sent by a dispatcher shall be displayed on the MDT screen in tabular format.

The MDT shall allow the vehicle operator to select a single pickup or dropoff, to view all additional manifest details, such as destination, customer name and fare, and to return from these details to the view of multiple upcoming pickups and dropoffs. The MDT screen shall display information on at least the current and the next three trips.

The MDT shall require that the vehicle operator acknowledge the receipt of an insertion, deletion or change to the current manifest. All changes in the manifest will be highlighted in distinct colors.

5.2.2.4   Navigation Assistance

The MDT shall display a map showing the current location of the vehicle and the location of the next pickup or dropoff at the closest zoom level where this route fits on the display. As the vehicle travels, the map view will automatically pan and zoom to continue to show this entire routing at the closest possible zoom level. An alternate available route following mode will show only the current location and the next upcoming turn.

Turn-by-turn directions for reaching the next pickup or dropoff will be provided both audibly and visually to paratransit vehicle operators. If the vehicle departs from the calculated route, a new route to the destination from the current location shall be calculated and displayed.

The MDT shall allow operators to override the map zoom level or pan the map display, and to select for the display to return to either of the default modes that automatically follows the routing.

After the MDT receives a manifest update or text message and alerts the operator, the navigation assistance function, if in use, shall automatically resume and continue offering audible and visual instruction to the operator without any need for the operator to interact with the MDT.

5.2.2.5   Trip Events

When the vehicle operator selects a pull-out, pull-in, pickup, no-show or drop off trip event, the MDT shall send a corresponding message to the paratransit scheduling and dispatch software.

The trip event message shall include the date/time, trip event type, location and odometer value.

Pickups with a pending no-show request or that have been cancelled due to a no-show should be indicated to the dispatcher.

The MDT shall continue to periodically attempt to send a trip event report until it receives an acknowledgement from the paratransit software that the report was received.

5.2.2.6   Covert Alarm

The MDT shall detect if the covert alarm switch circuit is closed for at least one (1) second and automatically send an alarm message to dispatch and place the MDT into the covert alarm mode.

The MDT shall periodically attempt to send the covert alarm message until it receives an acknowledgement message from dispatch.

When the MDT is in the covert alarm mode, there shall be no indication on the display other than an unobtrusive symbol or icon approved by the agency.

When the MDT is in the covert alarm mode, the MDT shall use a configurable alternate time between location reports.

The MDT shall only revert from covert alarm mode upon command from dispatch.

5.2.2.7   Text Messaging

The MDT shall allow the vehicle operator to send a text message (or its corresponding code number) to the dispatch center by selecting from a set of pre-defined messages.

The MDT shall periodically attempt to send a text message until it receives an acknowledgement message from dispatch.

The MDT shall store up to ten text messages received from dispatch, indicate to vehicle operators when there are unread text messages, and allow stored text messages to be viewed or deleted.

The MDT shall allow the vehicle operator to view received text messages that are longer than can fit on one line of the display.

The MDT shall automatically send an acknowledgement message to dispatch, once the vehicle operator has viewed a message flagged by dispatch as requiring acknowledgement.

5.2.2.8   MDT Alarm Reporting

The MDT shall report alarms generated by the MDT software via a data message to the dispatch center.

The MDT shall periodically attempt to send an alarm message until it receives an acknowledgement message from dispatch.

As long as the alarm condition persists, the MDT shall resend the alarm on a configurable time interval.

5.2.2.9   Taxi Meter (CGCTA Only)

The MDT shall include a taxi meter feature.

The operator shall press a button for the start and end of the trip. After the start button is pressed the MDT shall accumulate the taxi fare according to the odometer distance traveled, until the end button is pressed.

The current distance traveled and fare amount shall be continuously displayed on the MDT display.

At the end of the trip, the operator will be able to enter into the MDT the actual amount of the fare collected.

Data shall be stored in the MDT for each trip, with (1) the locations and date/time for both the start and end trip events, (2) the distance traveled and accumulated fare, and (3) the fare collected.

5.2.2.10   GPS Odometer

As an alternative to the hardwire odometer, a GPS-based odometer approach is permissible with certain conditions. A permissible GPS-based odometer shall use continuous data from the GPS receiver to calculate the distance travelled.

The overall accuracy shall be within 5% of that indicated by the dashboard odometer.

The MDT shall also collect the dashboard odometer at logoff and send this to the central software, in addition to the accumulated GPS odometer value.

The starting and ending dashboard odometer values from logon and logoff, and the accumulated GPS odometer values, shall be collected in a data table by the central software, together with the date, route number and vehicle number. A report shall be provided to calculate the average error between the GPS and dashboard odometer for all the trips over a selected period of time. The report shall exclude all runs where the difference exceeds a configurable number of miles (to exclude those apparently affected by operator error on the dashboard odometer values).

5.3   MDT Electronic Signature Capture (Option)

The electronic signature capture device shall allow a customer to use a stylus to record a digital version of their signature, that on shown on the display as it is signed (i.e., generally similar to devices used by delivery couriers or incorporated into self-service grocery checkout kiosks). The overall purpose is to collect and store a digital signature with the electronic manifest data in the MDT when needed, so that it can be included in the trip event data sent back to the central paratransit software as a replacement for the requirement of some funding sources to collect a physical signature.

The device shall be portable and dockable, so that the operator would upon arrival at a stop detach the device from its docking port and bring it to one or more boarding passengers for signature collection, after which they would reconnect it to the docking port upon which the collected signatures would be transferred into the MDT and stored with the correct manifest entry.

For cases where there are multiple signatures to collect at a single stop, the device shall not require that the operator separately detach and reconnect the device for each separate signature. Rather the device shall incorporate a clear and easy to use user interface that allows the operator to scroll between the multiple signatures to be collected (e.g., an example of such a user interface might shown at the top of the display the name of the customer that is to sign, with a "scroll" button that allows the operator to rotate among the list of customers that need to sign at that stop).

The device shall be immediately detachable and reconnectable with the docking port, without any need to interact with the MDT to do so.

All mounting and environmental ruggedness requirements stated with regard to the MDT also apply to this device.

The device shall operate on battery power when it is detached from the docking port, and the docking port shall incorporate a recharging system that recharges the device battery from vehicle power using a recharge cycle designed to maximize overall battery longevity.

Alternatives that avoid the need for a docking port through the use of short range wireless communications with the MDT and a recharging device alone will also be considered.

6 Paratransit Scheduling and Dispatching System

6.1 General

All software, except for computer-assisted scheduling software, shall use a relational database management systems based on SQL (either Microsoft SQL Server or Oracle).

All software shall provide a comprehensive purge capability that minimizes database storage requirements and purges archived records from online storage.

The Contractor shall be responsible for resolving any compatibility issues between software and any other existing installed software that need to be integrated with proposed ITS solution.

The Contractor shall implement all applicable and available software upgrades and patches during the implementation and warranty periods, and resolve any compatibility issues with other parts of the overall system due to such upgrades or patches.

Proposals must identify how the product(s) is licensed, as well as how many copies of the product(s) are being recommended, the type and cost of each product, and the annual support cost.

Proposals should offer descriptions and pricing options for the full range of technical support agreements alternatives offered. Proposals must describe the Contractor's support system (e.g., website, phone or other), the exact hours of support, and any/all fees associated with the support.

The software shall be installed on dispatch workstations per Section 2 (Overview) and Table 2.

A "thin client" software access method shall be provided that allows authorized agency workstations to access the software over the agency LAN or the internet without needing to have the full application software installed on the workstation.

The system shall receive incoming messages from all MDTs.

Incoming message types from MDTs shall include logon, logoff, location, device alarms and text messages.

The system shall log all outgoing and received data in a historical database, including date/time, vehicle number, operator number, dispatcher number, run number, trip number, and odometer reading, GPS latitude/longitude, message type, and message content. The historical database shall be read-only. Historical data shall be available in a format that is directly accessible by or importable into common database management and analysis tools.

The system shall interface with the MAS 90 accounting software to exchange data, for OATS only. The system shall be capable of integrating with the MAS 90 accounting software for receive up-to-date employee data, and provide data on employee work activities to support attendance and payroll timekeeping.

The system shall import an updated list of current drivers with a data table format provided by the agency, and track the time each driver spent logged into the MDT under the various work codes each day, including start and end time of work and total hours worked each day.

The system shall track whether each driver meets minimum rest time requirements between runs.

The system shall track whether each driver meets requirements for minimum/maximum assigned work load.

The system for OATS East Region shall be interfaced to the existing Metro St. Louis PASS system. The interface shall allow daily imports of trip data exported from the Metro Trapeze PASS database, using a data definition for the exported data table made available by OATS (from Metro in St. Louis).

A data repository system shall be implemented at OATS headquarters that provide for ongoing backup of replicated databases for all of the Region systems.

The Mid-MO Region system shall provide for remote access (e.g., thin client, web-based) from any workstation at any of the other Region system sites to provide a backup operational mode for these other Region sites. The other Region software shall run as a separate instance, so as to not interfere with the software that would need to remain in operation for Mid-MO Region itself. The backup software used for this purpose at Mid-MO Region would access the databases for the remotely accessing Region at the headquarters data repository.

6.2   GIS Mapping

The system shall include a GIS map meeting the overall system requirements, including the specific provisions of this section. The deploying agency retains the right to optionally supply the GIS base map for Contractor use with an appropriate cost reduction, meeting requirements provided by the Contractor, which the Contractor shall convert if necessary for use as the base map for the software.

The software shall incorporate GIS capabilities that allow users to view maps of the service area, individual trip patterns, and bus stops, each at various specified user-defined zoom levels.

Access to maps shall be seamless from within the software

GIS functionality shall include the ability to develop overlays for the coverage of municipal, township, census tracts or block groups and zip code boundaries.

GIS functionality shall include the ability to define service-based zones (e.g., Americans with Disabilities Act (ADA) complementary paratransit service area, fare zones).

The system shall permit the definition and display of physical features that act as barriers to transportation.

The system shall be capable of defining and displaying point files, indicating system timepoints, bus stops, major intersections, major transfer points, and major destinations of travel, or other points of interest (e.g., tourist attractions).

A service area map shall include current data for all street segments, ensuring that every segment is appropriately connected in the network and has a defined street name and address range. The system shall have full geocoding capability, allowing the system to locate the address on the map for an address

input. The street segments database shall be sufficiently complete to assure a geocoding success rate of 90 percent or better based on a sample of addresses developed by the deploying agency. The system shall be capable of handling various abbreviations of names (e.g. St. for Street and Av. or Ave for Avenue) in the geocoding process.

The system shall allow the user to calculate the distance between points or along a specified portion of the street or route network.

The street network definition shall include segment characteristics (e.g., speed limits, one-way direction).

The system shall allow authorized users to edit the base map layers (e.g., to add new streets, change municipal boundaries, define any incomplete address ranges).

The system shall be capable of printing maps to peripheral devices (e.g., printers, plotters) directly attached to the workstation or available over a Local Area Network (LAN).

6.3   Existing Client Database Conversion.

The Contractor shall be responsible for converting the existing client databases at the participating agencies. The proposal shall identify specific quality controls to ensure that data is accurately converted and to ensure the integrity of existing data at each of the participating agencies. In the event that certain fields within the existing database are not supported in the system, deploying agency shall be notified and negotiations held to determine the importance of the field and whether the agency will require customization of the system client database structure.

6.4   Client Registration

Client Name. The system shall require entry of first name, last name and middle initial. When entering data, the system shall utilize search, pop-ups or other appropriate techniques to detect and alert the user if there may already be a client database entry under this name.

Client Identification Number. The system shall assign a unique client identification number for each entry in the deploying agency client database.

Medical Assistance (Medicaid) Identification Number. The system shall allow entry of the Medicaid identification number.

Social Security Number. The system shall allow entry of the client social security number.

Date of Birth. The system shall require entry of the client date of birth using a pop-up interactive calendar interface. A second field should display an automatically calculated client age, expressed in years, based on the current date and the date of birth.

Gender. The system shall require entry of client gender, using a pop-up window or list box to enable easy selection.

Client Addresses. The system shall allow multiple address entries for common client pick-up locations, and shall require at least one pick-up address entry. The system shall require that one address be flagged as the default. The system shall provide a separate field for the client mailing address in case the client uses a non-street mailing address.

Address Geocoding. The system shall identify and automatically geocode the location associated with each entered address. If the automatic geocoding fails, the system shall provide alternative methods of establishing x- and y- map coordinates for the address. One of the alternative methods supported shall be clicking on a map location with the mouse.

Address Comments. The system shall allow entry of a text field for special instructions (for subsequent printing on manifests) to assist in locating the client address.

Telephone Number. The system shall allow entry of a client contact phone number.

Backup Telephone Number. The system shall allow entry of a backup client contact phone number.

Certification Date/Expiration Date. The system shall allow entry of a certification date defining when the client is authorized to begin receive service. As some clients have temporary eligibility, the system shall also allow entry of a certification expiration date. Certification and expiration dates must be capable of being specified separately for specific funding sources. Dates shall be entered using a pop-up interactive calendar interface.

Mobility Aid Code. The system shall allow entry in a field indicating whether a client uses a mobility aid. The system shall provide a pop-up window or list box to permit selection from among a list of pre-defined mobility aids.

Disability Code. The system shall require entry in a field specifying disability status. The system shall provide a pop-up window or list box to permit selection from among a list of pre-defined disability definitions.

Billing/Funding Codes. The system shall allow entry of one or more billing codes for each client, indicating a third party to be billed for certain trip types. The system shall provide pop-up windows or list boxes to permit multiple selections from among a list of pre-defined trip types and selection of a billing code for each selected trip type.

Emergency Contact Information. The system shall allow entry of the name, address and phone number of a care-giver or other contact to be used in the event of an emergency.

Comments/Notes. The system shall allow entry of additional comments or information of importance to the client registration record. Information on this field shall appear on any manifest trip entry for that client.

Custom Data Entry Fields: The client registration shall allow each participating agency to add up to four additional customized data fields.

6.5   Trip Booking

Real Time Trip Booking. The system shall permit trip booking while the call taker is on the phone with the client. The system shall be capable of booking both subscription (standing-order) and demand response trips in this manner. The system shall be capable of booking same day trips.

Client Look-Up Function. The system shall permit the deploying agency call takers to retrieve the client record by entering the client ID number, client last name, or telephone number. For client retrieval by last name, a pop-up window or list box shall be used to list all clients with the last name beginning with the characters entered. Once selected, a trip booking data entry screen shall be presented to the call taker, pre-populated with all data for that client which remains constant (e.g., ID numbers, mobility limitations).

Default Pick-Up Address. The system shall initially automatically present in the trip booking screen the address configured as the default pick-up address. The system shall allow entry of an alternative pick-up address using keystroke entry or through use of a list box of the alternative pick-up addresses (from a list of common locations) associated with that client.

Drop-Off Address Selection. The system shall allow selection of the drop-off address, through a pop-up window or list box, from among several frequently and/or recently used drop-off addresses for that client. The system shall allow entry of an alternative drop-off address using keystroke entry or through use of a list box of the alternative drop-off addresses (from a list of common locations) associated with that client.

Trip Purpose Selection: The trip purpose shall be entered from a dropdown list with entries configurable by the participating agency.

Trip Date Selection. The trip date shall be entered using a pop-up interactive calendar interface. The system shall be capable of accepting trip bookings up to a set number of days in advance of the requested trip date for subscription trips and a set number of days in advance of the requested trip date for regular trips, with both of these parameters configurable by the participating agency.

Pick-Up Time Negotiation. Pick-up time negotiation requirement is no more than a set number of minutes before or after the client's desired departure time, with this parameter configurable by the participating agency. The system shall require entry of a requested pick-up time and allow entry of a negotiated pick-up time within the limits of this window.

Standing Order Trip Entry. The system shall allow the definition of standing order trip bookings, with flexible options to specify recurring travel dates. At minimum, the system shall support selection of a recurring weekly day (e.g., every Tuesday), a recurring monthly day (e.g., every 2nd Wednesday) or a recurring monthly date (e.g., the 4th of every month).

Temporary Suspension of Standing Orders. The system shall allow the booking clerk to temporarily suspend a particular standing order, with entry of both start and end dates of the suspension time period. These dates shall be entered using a pop-up interactive calendar interface.

Holiday Standing Order Suspension. The system shall automatically suspend standing orders on holidays when services are not in operation. The system shall provide a function to allow the booking clerk to enter or adjust such holidays.

Standing Order Statistics. The system shall monitor the percentage of standing order trips out of all trips, for ADA-eligible clients, to ensure compliance with ADA regulations (40 CFR Part 37.133(b)).

Group Trip Bookings. The system shall allow the call taker to designate any completed trip booking as a group booking (e.g., a trip for a group of two or more individuals traveling to a common destination that will be scheduled, as a matter of system policy, to the same run), and then add or delete individual clients from the group booking.

Editing Trip Bookings. The system shall allow the call taker to access existing trip bookings to edit the pick-up address, drop-off address, trip date, and/or pick-up time upon client request. The system shall assign a unique identification number to each trip booking record to facilitate trip editing.

Trip Booking Certification Expiry Alert and Override. The system shall alert the call taker during a trip booking when the certification expiration date for the funding source will have passed on the trip date. The system shall allow the call taker to book the trip nonetheless by overriding this feature. The system shall flag all trip bookings for which this override was applied.

Trip Cancellation. The system shall permit cancellation of any trip booking, when consistent with deploying agency policies. The system shall retain the trip booking and flag it with the date and time when it was cancelled to facilitate the deploying agencies management of its cancellation policies.

Booking Conflicts Alert and Override. The system shall alert the call taker if the client has previously booked a trip with a trip time period that is in conflict with the selected booking pick-up time. The system shall allow the call taker to book the trip nonetheless by overriding this feature. The system shall flag all trip bookings for which this override was applied.

Graphical Trip Display. During each trip booking, the system shall display, using the GIS software capabilities, the map locations for the pick-up and drop-off locations.

Suspended Service. The system shall allow entry of a start and end date for the time period when a client's ridership privileges are suspended. If the selected trip date is within this suspended service time period, the system shall alert the call taker that the trip booking cannot be completed for this reason. These dates shall be entered using a pop-up interactive calendar interface.

Personal Care Attendants or Other Companions. The system shall allow entry, during the trip booking process, of the names of any Personal Care Attendants or other companions (e.g., children) that will accompany the client on the trip.

Fare Computation. Once all other trip booking information has been entered, the system shall indicate to the call taker any applicable fare(s) to be paid by the client and any companions.

Booking Confirmation. The system shall, at the conclusion of the trip booking process, confirm to the call taker that the booking was successfully entered into the system.

Custom Data Entry Fields: The client registration shall allow each participating agency to add up to four additional customized data fields.

6.6   Scheduling

Automated Batch Scheduling. The system shall be capable of scheduling, in batch mode, all bookings for the next travel day. Scheduling should be based on the actual street network in each of the deploying agency service area, using parameters associated with street network segments as established in the GIS system (e.g., physical barriers, running speed by time of day, and appropriate dwell times for the boarding and alighting of passengers).

Trip Priorities. The system shall schedule ADA complementary paratransit trips, which require higher service standards, at the same time as other paratransit trips. Proposers shall describe how the system processes trip priorities during scheduling.

Subscription Trips. The system shall allow subscription run templates to be developed, based on standing orders. The system shall optimize the templates for least distance and/or travel time, based on the street network segment parameters stored in the system.

Manifests. The system shall produce a daily manifest for each run, indicating pull-in and pull-out times, the projected arrival time of the vehicle at each pick-up and drop-off location, and listing the trip events in chronological order.

Manifest Display and Adjustment. Once generated, the system shall be able to display all manifests for a given day. The system shall provide tools to allow manual adjustments to the run manifests, including manually moving trips between manifests.

Validation. The system shall have internal validation checks to ensure that manifests do not violate work and labor rules (e.g., driver work hours and breaks). The system shall also perform validation checks to ensure that policies limiting travel times for individual passengers are not violated.

Vehicle Assignment. The system shall schedule each run based on an assigned vehicle, recognizing the accessibility needs of the scheduled clients and vehicle capacity constraints.

Same Day Scheduling. The system shall allow trips to be added to an existing run on the same day as the run. The system shall identify a range of alternatives for assigning the trip to existing runs for that day so as to best satisfy the requirements of the reservation while minimizing any impact on existing reservations. The system shall present these alternatives in rank order with a numerical "score" to indicate the degree of difference between choices presented to the reservation clerk.

Dynamic Schedule Update. The system shall reschedule all runs after scheduling or canceling a trip from a run on the same day, to ensure that manifests continue to meet all requirements.

Capacity-Based Scheduling. All system scheduling solutions or recommendations (e.g., automated batch scheduling, same day scheduling, dynamic schedule update) shall be based on the specific capacity constraints of each vehicle and the remaining capacity of each vehicle at each point in the vehicle run given

the trips previously scheduled to that vehicle. Capacity-based scheduling shall take into account any additional riders associated with a pickup (e.g., accompanying persons, Personal Care Attendants) and the relative increase in capacity used for a person using various types of mobility assistance devices (e.g., wheelchair, scooter). This capability shall also take into effect vehicle-specific capacity effects of loading a person using particular assistance devices, in a dynamic manner that takes into consideration how the vehicle will have been loaded to that point in the vehicle run (e.g., a vehicle with a bench seat that needs to be raised to load and secure wheelchairs might consume two or three ambulatory person seat positions by boarding even a single wheelchair, but then be able to board another wheelchair in the space so created without any further use of capacity).

6.7 Dispatching

Access to Manifests. The system shall allow dispatchers to access run manifests using the run number, vehicle number, client number, or client name. The system shall display the run number, the list of passengers, the scheduled arrival time and funding source for each trip, the estimated arrival time for each pick-up and drop-off, and any special circumstances. The run manifest display should list trip events in chronological order, beginning with the next upcoming trip event.

Same Day Changes. The system shall automatically display any same day manifest changes to the dispatcher, so that the dispatcher can convey these changes to the affected drivers.

No-Shows. The system shall allow dispatchers to process no-shows when reported by drivers. The system shall track any such events.

Service Emergencies. If a vehicle must be removed from service, the system shall allow the dispatcher to associate a newly assigned vehicle with the run. If no alternative vehicle is available and the run must be cancelled, the system shall attempt to dynamically reschedule all the affected trips onto existing runs, with priority to any trips that were already underway on the affected vehicle.

Dispatcher Entry of Trip Event Times. The system shall allow easy dispatcher entry of trip event completion times (i.e., as written on the manifest by the driver or reported by radio).

6.8 MDT Interface

Paratransit MDTs shall be interfaced with the proposed paratransit scheduling and dispatch software, using the mobile data communications system, to establish all required functionality.

The system shall log all outgoing and received data in a historical database, including date/time, GPS latitude/longitude, vehicle number, operator number, dispatcher number, run number, odometer reading, pick-up time, drop-off time or no-show time, message type, and message content. The historical database shall be read-only. Historical data shall be available in a format that is directly accessible by or importable into common database management and analysis tools.

6.9   MDT Logon Verification

The system shall verify whether the operator number received from the MDT are valid and send a message to the MDT indicating whether the logon attempt was successful or failed.

6.10   Location Tracking

The system shall display on the map the last reported location for all vehicles, using an icon indicating route direction and labeled with the vehicle ID, run ID or operator ID as selected by the user.

The display shall provide an indication if the last reported location is older than the reporting interval.

The time interval at which location reports are received shall be configurable by the agency.

6.11   Location Playback

The dispatcher shall be able to review on the map display the chronological sequence of reported locations for a specified vehicle over a specified time period.

The software shall provide controls to view the entire sequence of reported locations from the beginning of the time period or to step through the sequence incrementally forwards or backwards.

6.12   Manifest Transmission and Changes

The system shall produce a daily manifest for each run, indicating pull-in and pull-out times, the projected arrival time of the vehicle at each pick-up and drop-off location, listing the trip events in chronological order.

The system shall have the capability to produce a daily manifest for each run and to transmit the manifests to their corresponding vehicles the afternoon before the service day.

The system shall be able to generate and display all manifests for a given day. The system shall provide tools to allow manual adjustments to the run manifests, including manually moving trips between manifests.

The system shall send manifest trip pickup and dropoff data to the MDT in the vehicle assigned to that manifest.

The dispatcher shall be able to configure which portions of the upcoming manifest entries shall be sent to the MDT (e.g., the next X trips, all trips in the next Y minutes).

Additional portions of the manifest shall be automatically sent to the MDT on an ongoing basis as trip events are completed, in accordance with the deploying agency-configured manifest transmission parameters.

The system shall automatically display any same day manifest changes, such as trip additions, no shows or cancellations, to the dispatcher and transmit these manifest changes to the MDT in the vehicle assigned to that manifest.

6.13 Trip Events Logging

The system shall receive trip pull-in, pull-out, pickup, no-show requests and dropoff event reports from MDTs, and use this data to update the time and reported location for each trip event.

The system shall acknowledge the receipt of trip event messages to the MDT.

Based on the logged trip events, the system shall update the estimated time of arrival for the remaining manifest trips and display this information to the dispatcher.

The system shall receive no-show requests from MDTs, allow dispatchers to decide whether to authorize the no-show, record the time when the no-show was authorized, mark the pickup and dropoff in the manifest as a no show, and transmit the cancellation of the pickup and dropoff as manifest changes to the MDT in the vehicle assigned to that manifest.

6.14 Trip Events Entry for Non-MDT Vehicles

The system shall provide a method for the rapid entry of trip completion events data (i.e., from marked up manifests) for those vehicles not equipped with MDTs.

In general, this method shall provide a table for the daily trips completed by a particular vehicle, allowing for the entry of the actual trip completion event details by moving within the table using arrow navigation keys. An alternative specific approach acceptable to the participating agencies may also be permissible. The specific approach should be detailed in the proposal. The intent is to avoid the slow data entry speeds and errors that can result when data entry staff must individually select fields onscreen.

6.15 Text Messaging

The system shall allow the dispatcher to view received text messages in a tabular display that also indicates the vehicle ID and the time of the message.

The system shall allow the dispatcher to send a text message to a single MDT, a predefined group of MDTs, or all MDTs within an area selected on the map display.

The system shall allow the dispatcher to select one of a set of predefined text messages or enter a free text message.

The system shall allow any message sent by dispatch to be flagged as requiring operator acknowledgement, and shall allow the dispatcher to view a list of such messages that have not yet been acknowledged.

6.16 Incident Reports

The system shall allow the dispatcher to initiate a new incident report. The new incident report form shall appear in a separate window, including an automatically generated date /time, a drop-down list box to select an incident type and a box to enter free text information.

The system shall allow authorized users to append to an existing open incident report, with other system users limited to read-only access. The user shall be able to select from a list of currently open incident reports that can be sorted by date/time, incident type or initiating dispatcher. The selected incident report shall appear in a separate window, and shall be available for editing.

The system shall allow authorized users to close an existing open incident report. The user shall be able to select from a list of currently open incident reports, which can be sorted by date/time, incident type or initiating dispatcher. The user shall be asked to confirm the selected incident report before the incident is closed.

The incident report database shall indicate for each incident report the date/time of opening the report, the incident type, the initial incident text, the initiating dispatcher, the date/time of each subsequent modification, each modified version of the text, the modifying dispatcher, the date/time the incident was closed and the closing dispatcher.

6.17 Alarm Handling

The system shall display all alarm messages received from the MDT to the dispatcher using a tabular display, and shall display a modified vehicle icon on the map display when an alarm condition is in effect.

The system shall notify the dispatcher that a covert alarm message has been received, using an agency approved user interface visual method. There shall also be an agency approved audio notification method, which the agency shall be able to configure as on or off.

The system shall not allow the dispatcher to send a text message transmission to a vehicle while it is in covert alarm mode.

The system shall allow the dispatcher to command the MDT to terminate the covert alarm state.

6.18 Data Logging and Retrieval

All vehicle location and status data transmitted to dispatch shall be maintained online for a period of twelve months for retrieval, analysis, display and printing.

This historical information shall include all data transmitted from vehicles to dispatch (logon/logoff data, emergency alarms, vehicle system alarms, location data, and data transmitted from other equipment on-board the vehicles); and all software application user logons and logoffs.

The online data storage system shall ensure data integrity in the event of a computer disk drive failure.

In addition, the system shall include a means of archiving transaction data, or restoring data from an archive, while the system is in operation. It shall not be necessary to shut down the database to perform a successful backup or restore operation.

The stored data shall be time and date stamped, and shall contain sufficient information to enable selective sorting and retrieval based on user-specified selection criteria. At a minimum, the following sorting and selection criteria shall be supported for accessing the historical data from both the online and archived storage: date and time, GPS latitude/longitude, vehicle number, operator number, dispatcher number, run number, odometer reading, and incident type (where needed).

Historical data shall be read-only with modification only permitted to individual pre-defined fields.

6.19 Reports

The reporting system shall be capable of generating browser-based daily, monthly and annual reports addressing operations, financial, customer, customer service, system, maintenance, management and planning considerations, as well as MoDOT required reports.

Reporting must address regular and ad-hoc requirements, and reporting frequency.

All reports shall use standard reporting tools (e.g., Crystal Reports or MS Access) and shall have the ability to export data into file formats that can be with a web browser or viewed and edited with standard office software (e.g., Microsoft Internet Explorer, Word and Excel versions used by the participating agency).

The system shall provide the following manifest, reporting, query and invoicing capabilities, so as to conform with the current reports in use by the participating agency:

The system shall produce daily manifests for printing and issuance to drivers, listing the following information for each run:

Cover Sheet:

Service date

Carrier

Run Number

Assigned vehicle

Trip Sheets:

    Run number

    Client name

    Pick-up address and phone number

    Scheduled pick-up time

    Space to write in actual pick-up time and odometer reading

    Drop-off address and phone number

    Scheduled drop-off time

    Space to write in actual drop-off time and odometer reading

    Appointment time

    Fare to be collected

    Space to write in amount collected

    Billing agency (e.g., Medicaid)

    Bill code

    Whether there will be an accompanying PCA

    Space to write in status of trip

    Trip number

    Passenger type (e.g., ambulatory)

    Driver notes

    Comment

At the end of the manifest, provide the following totals:

    Number of riders by disability type (e.g., ambulatory, on wheelchair)

    Fares collected

The system shall produce, at minimum, daily, weekly, and monthly reports for the following:

Trips provided

Ridership by billing agency

Paratransit ridership

MoDOT standard monthly ridership report

Passenger travel time, by run or user group

Service turn-downs

Percent of ADA trips that are standing orders

Number of cancellations

Number of no-shows

Number of vehicle hours/miles

Number of billable hours/miles

Fares received

Active fleet (weekday and weekend)

Actual versus negotiated pick-up and drop-off times

Late/failed pick-ups and drop-offs

Productivity

Number of incidents/accidents

National Transit Database (NTD) annual Rural and Urban reports in accordance with federal transit administration rules

The system shall generate final monthly invoices in the formats required by each of the deploying agencies' funding sources, allowing for multiple rates, per trip, mile, and hour.

The system shall provide the capability to generate queries of the database used for reporting.

For providing customized reports based on the needs of individual agencies, the proposer shall provide price/report in the price proposal.

6.20 Data Archiving at Agencies

Data shall be initially retained in an operational historical database, for immediate access via the software to support review, adjustments, analysis or reporting. Storage capacity shall be large enough to retain at

least thirteen months of data in this operational historical database, and it shall be possible for a participating agency to configure the system to operate using a shorter time period for the operational historical database if desired.

A first level of archiving shall be to a "non-live" historical database, and shall be undertaken on an automated basis by the system once data has reached the configured age. "Non-live" refers to a read-only database that is not accessed by the software on a default basis. Storage capacity shall be large enough to retain at least 24 months of data in this "non-live" historical database.

A second level of archiving shall be from the "non-live" historical database to an archival read-only storage media (e.g., DVD). Second level archiving shall be performed manually on an as-needed basis by the agency.

It shall be possible to set the software to access data stored in any combination of the two historical databases and second level archival media, to support overall review, analysis or reporting of all the data.

The Proposer shall determine and describe the need and procedure for an incremental, daily or other time frame-based, back up of ITS databases. Other needs related to the archiving of ITS data, such hardware and software, shall also be determined and described by the Proposer.

7 Maintenance Management System (MMS)

7.1 General

The successful Proposer shall provide all software and hardware that comprise the MMS, all upgrades to the software that would make it current and the required number of licenses for all users.

The successful Proposer shall determine the necessary data required to make the system operational (e.g., maintenance history) and then identify, in conjunction with the agency's staff, what data will be available from current systems, and what data may have to be developed. Once the data conversion specifications are completed, the successful Proposer shall be responsible for scrubbing, if necessary, verifying, and populating MMS with this data.

The system shall allow concurrent users from a single agency full access to the system at any given time to input, retrieve, access, modify and print data.

The MMS shall only be accessible to authorized users through entering valid passwords.

In addition to providing transaction audit trails within the software, the MMS will maintain audit trails and produce audit reports identifying when system maintenance was performed (user, date, action).

The MMS shall provide a customizable on-line help system that supports site-specific procedures and instructions.

The MMS shall allow corrections to be made throughout the life cycle of a form (such as a Work Order).

The Contractor shall install the system for each agency per Section 2 (Overview) and Table 2.

7.2 Work Orders

A work order module shall be used to track and monitor all maintenance tasks.

Work orders data shall include site, cost code, item, problem type, personnel assigned, priority codes, specialty codes, budgets for material and labor, and completion dates.

The MMS shall provide the capability of creating, scheduling, updating, printing, tracking and closing work orders for preventive, corrective, and emergency maintenance.

Information to be incorporated in a work order shall include the vehicle or equipment worked on, the procedure and tasks, the parts required, any special tools required, and the amount of labor used.

The MMS shall support various types of work orders and shall utilize data from various subsystems to provide additional information and take action on tasks required to support the work order.

Each work order shall track multiple reasons for repair, multiple job types, job estimates, and unlimited technicians, labor charges, and parts.

The work orders module shall provide adequate reporting to monitor the work order process by division, by task, by exception.

The MMS shall provide the functionality to project labor demands for any future time period based upon the work orders.

As work orders are closed, accomplished tasks shall be written to a historical database identified by vehicle number or assembly serial number.

Deferred tasks shall be maintained as open items.

The MMS shall provide the capability to view all planned work orders by day, week, two weeks, or four weeks at a glance.

The MMS shall allow maintenance staff to define its fiscal calendar and billing cycle(s).

Work orders shall span fiscal years, enabling the current billing year to be closed, even if open work orders exist.

The MMS shall allow staff to allocate funds and charge for fuel, capital equipment expenditures, maintenance services, commercial repairs, accident repairs, overhead, and daily rental fees.

The MMS shall schedule employees by ability to perform work (skill level) and labor hours available.

Scheduling of work shall also accommodate labor standards requirements.

7.3 Maintenance Scheduling

The MMS shall schedule daily and weekly regular preventive and predictive maintenance on vehicles, buildings, stop signs, or passenger shelters.

The MMS shall automatically calculate the preventive maintenance due date.

The MMS shall schedule preventive maintenance work orders based on frequency of days, hours/miles, and fuel consumption.

The MMS shall schedule preventive maintenance based on established hierarchies.

The MMS shall automatically generate and print work orders for scheduled preventive maintenance.

The MMS shall expediently generate proofs.

The MMS shall accommodate for maintenance to a particular vehicle, performed as a one (1) time event (non-routine).

The MMS shall also record road calls by vehicle, time of day road call is made, and mileage of road call vehicle.

The MMS system shall provide instructions for scheduled maintenance to be performed.

The MMS shall identify parts required for scheduled maintenance.

The MMS shall accumulate labor and parts cost for scheduled maintenance.

The MMS shall keep track of outside contractor work.

7.4 Warranty Tracking

The warranty claims process shall be fully automated.

The MMS shall support a "multi-tiered" warranty hierarchy that will allow agency staff to track equipment warranties by whole unit (chassis), vehicle, model, year, assemblies, and serialized components.

The MMS shall generate warnings to indicate "under warranty" conditions and prevent warranty violations while work is being performed.

All warranty-related repairs shall be tracked.

The MMS shall track warranty claims submission and records reimbursement of in-house warranty work

Warranty periods shall be stated in months, years, and miles.

The MMS shall generate and track warranty parts and identify parts under service conditions through work order processing.

The MMS shall produce required paper information for vendor payments, returns, or exchanges. The initiation of the warranty process may occur through the purchase of new vehicles, parts, or vendor repairs.

7.5 Security

The MMS shall allow each agency to assign certain rights/permissions (no access, read-only, or read and write) to specific individuals.

The MMS shall categorize users with predefined groups and profiles.

The MMS shall provide workstations where employees can enter only work orders and purchase order requests.

7.6 Reports

The MMS shall allow viewing and/or printing information detailed by item or summarized by groups.

The MMS shall provide the users with the capability to customize reports to suit each agency's specific needs.

The MMS shall provide the capability to summarize data for departmental reporting requirements.

The MMS shall allow users to view reports on-line, print hard copies, or distribute reports via e-mail.

The MMS shall have the capability to schedule and generate batch report runs without disrupting user sessions.

The MMS shall have the capability to schedule automatic generation of off-line reports or lengthy reports for off-peak hours.

All reports shall use standard reporting tools (e.g., Crystal Reports or MS Access) and shall have the ability to export data into file formats that can be with a web browser or viewed and edited with standard office software (e.g., Microsoft Internet Explorer, Word and Excel versions used by the participating agency).

The MMS shall allow users to create graphical reports that include color-coded charts and graphs.

For providing customized reports based on the needs of individual agencies, the proposer shall provide price/report in the price proposal.

8 Smart Card Client Verification and Fare Payment System

8.1 General

The implementation of the on-board contactless smart card reader is intended to help validate that boarding passenger is the booked client and to provide a smart card stored value alternative to cash for fare payment.

The on-board smart card reader shall be integrated with the MDT, with a readily identifiable target area facing the passenger area.

8.2 Card Processing Requirements

The smart card reader shall be capable of reading the client ID, validity date and (if desired) a stored value balance, when the card within 4 inches from the reader target, and writing back to the card the updated stored value balance after fare payment.

If the smart card is not recognized, the card reader shall inform the driver via a message to be displayed at the MDT with an accompanying distinct tone.

If the smart card is recognized but the client ID does not match the client ID from the manifest for the current pickup highlighted onscreen, or if there is insufficient stored value balance for fare payment, the card reader shall inform the driver via a message to be displayed at the MDT with an accompanying distinct tone.

If the smart card is recognized, the client ID matches the client ID from the manifest for the current pickup highlighted onscreen, and there is sufficient stored value balance for fare payment, the card reader shall update the card stored value balance and inform the driver via a message to be displayed at the MDT with an accompanying distinct tone.

The smart card reader shall allow automatic processing of a correctly presented card within 0.5 seconds.

If a smart card is not presented, or the presented smart card is not accepted by the reader, the MDT shall still allow the operator to indicate the trip events for that pickup.

8.3 In-Vehicle Hardware Requirements

All equipment modules, cables, mounting hardware and connectors shall be designed to withstand the full range of operating environments found in the areas in which they are to be installed, and shall not interfere with the operation of existing and future equipment.

Each connector in a given physical location shall be keyed or otherwise configured as to prevent inadvertent mis-wiring during installation or maintenance. Each component/module/subsystem distinctly defined in these specifications shall be replaceable as a discrete unit. Each electronically addressable component/module/subsystem shall be electronically identified by a unique serial number.

Electronic data interfaces between each distinct module and subsystem shall be optically isolated from all data input and output connectors.

All data inputs and outputs, whether serial or parallel, shall be protected against over-voltage and reverse polarity. This protection shall be designed to absorb "routine" over-voltages and reverse polarity conditions, and to open respective circuits in the event of "extraordinary" conditions, sacrificing inexpensive and easily identifiable components as necessary to protect more expensive or less easily troubleshoot components.

Each module and subsystem shall include protection against damage due to electrical overload per SAE J1292. In case of electrical overload, such protection shall open the electrical supply circuit of affected modules and subsystems before additional damage to said modules and subsystems, or to other modules, subsystems or power supplies, can occur. Overload protection devices in modules and subsystems shall not be automatically reset. The respective current rating of any overload protection device shall be clearly indicated on each such device.

The Contractor must provide mobile hardware specifically designed for the harsh transit environment. Equipment provided shall be designed to operate effectively throughout temperature extremes of from -30°C (30° below zero C) to +60°C, and to withstand the vibration and shock forces associated with transit vehicles. Equipment shall meet the requirements of this specification under all conditions encountered in transit operations. All in-vehicle equipment shall be housed in splash-and tamper-proof enclosures.

The on-board card reader units shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. The location of the on-board card reader units shall be determined in collaboration with the agency's staff.

8.4   MDT Interface

The integrated smart card reader shall exchange data with and receive power from the MDT, via a standard wiring harness incorporating electrical isolation on the data connections. Interruption of power to or communications with the reader shall not interrupt MDT operation. The smart card reader shall automatically resume operation with no loss of function upon restart of the MDT or the restoration of electrical power.

8.5   Smart Cards

The smart cards shall be compatible with the smart card readers implemented in the MDTs and in the revaluing and issuance workstations, and communicate using a standard contactless interface compliant with ISO 14443 Type A or B.

The smart card data format and communications protocol shall be documented and provided to the participating agency, with sufficient detail to allow the option of purchasing additional smart cards in the future from a third party that will be able to be used with the smart card readers in the system interchangeably with those initially supplied.

8.6   Smart Card Issuance and Revaluing

The agency shall be providing with equipment to issue a smart card with selected client ID and validity date, which could then be mailed to the customer.

When the card validity date needs to be extended or the stored value balance increased (i.e., upon agency receipt of a prepayment), the central software shall be able to send data to the MDTs to enable the smart card to be updated when it is next presented to an MDT smart card reader.

8.7   Central Software

The smart card system shall collect and record the client identification from the smart card, as well as the fare amount deducted from the card stored value balance;

Where the customer has provided a smart card account payment through the web or IVR systems (or directly over the phone or at agency offices), the system shall retrieve the account payment data and send this data out to the MDT as part of the manifest for the next pickup of that passenger and increment the smart card stored value balance to reflect this payment amount when the card is presented to the MDT smart card reader during boarding. The smart card system shall recognize from the trip completion data that this smart card stored value updated was completed, and without such confirmation shall include the stored value update in the pickup on a subsequent manifest.

Data uploads from the buses shall occur over the mobile data communications system;

The system shall reconcile onboard electronic fare payment data with smart card account payment revenue collected;

Data shall be downloaded into a secure database for future retrieval and analysis;

8.8   Reports

The system shall provide the users with the capability to customize reports to suit each agency's specific needs.

The system shall allow users to view reports on-line, print hard copies, or distribute reports via e-mail.

The system shall have the capability to schedule and generate batch report runs without disrupting user sessions.

The system shall have the capability to schedule automatic generation of off-line reports or lengthy reports for off-peak hours.

All reports shall use standard reporting tools (e.g., Crystal Reports or MS Access) and shall have the ability to export data into file formats that can be with a web browser or viewed and edited with standard office software (e.g., Microsoft Internet Explorer, Word and Excel versions used by the participating agency).

The system shall allow users to create graphical reports that include color-coded charts and graphs.

For providing customized reports based on the needs of individual agencies, the proposer shall provide price/report in the price proposal.

9 Back Up Warning System

9.1 General

The backup warning system shall automatically get activated only in the event of reverse movement of a bus.

All equipment modules, cables, mounting hardware and connectors shall be designed to withstand the full range of operating environments found in the areas in which they are to be installed, and shall not interfere with the operation of existing and future equipment.

Electronic data interfaces between each distinct module and subsystem shall be electrically isolated from all data input and output connectors.

All data inputs and outputs, whether serial or parallel, shall be protected against over-voltage and reverse polarity. This protection shall be designed to absorb "routine" over-voltages and reverse polarity conditions, and to open respective circuits in the event of "extraordinary" conditions, sacrificing inexpensive and easily identifiable components when necessary to protect more expensive components or those less easy to troubleshoot.

The backup warning system shall be designed to operate in accordance with these specifications for ambient temperatures from -22 °F to 149°F (-30°C to +65°C).

The backup warning system shall be designed to operate in accordance with these specifications for ambient humidity from 5% to 95%, non-condensing.

The backup warning system shall conform to FCC part 15 Class B limits for conducted and radiated emissions of electromagnetic interference.

The backup warning system shall be tested and proven capable of withstanding power transients and radio frequency interference without degradation at levels that are known to exist in ordinary circumstances.

The backup warning system and all other on-board components shall be sealed against dust and water intrusion, certified in compliance with the NEMA 4 or IP65 standard (or better).

The backup warning system shall be modular, with sensitive components sealed using conformal coating qualified to MIL-I-46058C.

Sensors and all other components in the backup warning system shall be designed and installed to withstand the vibration and shock forces associated with transit vehicles.

The Contractor shall provide appropriate in-vehicle equipment for all vehicles for each agency per Section 2 (Overview) and Table 2.

9.2 Sensors

The backup warning system shall use range sensors, based on radar, ultrasonic or similar technology.

Sensors shall be mounted at the rear end of a bus exterior.

Sensors shall be mounted using a steel and rubber mounting brackets.

Sensors shall be able to detect both stationary and moving objects. For vehicle objects, sensors shall be able to detect all types of private and commercial vehicles with varying ranges of height and width.

Sensors shall be able to detect objects located within an area up to six (6) meters deep and three (3) meters wide area behind a bus.

Sensors shall be able to distinguish electromagnetic signals received from multiple reflectors (objects) in case of closely located objects (e.g., a parked car and a pedestrian).

Sensors shall be able to detect a stationary object at a distance of at least two (2) meters in the direction of vehicle movement in rear direction.

Sensors shall be able to detect a vehicle moving forward from behind the vehicle at least at a distance of six (6) meters, at a relative velocity of more than 15 miles an hour.

Sensors shall be able to detect pedestrians and people in wheelchairs behind a bus.

Sensors shall be able to detect a curb at a distance of at least two (2) meters.

Sensors shall be able to detect all solid objects of at least two (2) inches height at a distance within one meter.

Sensors shall be able to detect objects in case of poor visibility conditions.

Sensors shall be able to function in rain, snow, fog or icy conditions.

Sensors shall be able to detect objects at any time of day and shall maintain their accuracy under the full range of ambient illumination conditions including high sun glare conditions.

9.3 Controller

The controller unit shall process signals received from sensors at least every 100 milliseconds.

The controller unit shall calculate the distance between the bus and the detected object based on the sensor output and pass that information onto the warning unit.

The error in detection of distance of the bus from the object shall be within one inch.

The controller unit shall be housed inside a vandal resistant enclosure and shall be installed inside the bus.

9.4   Warning Generator

An audible warning shall be generated for the bus driver based on signal output provided by the processor unit.

The audible warning shall distinguish among high, medium and low levels of alerts by using different tones and frequencies of beeps (e.g., continuous beeps for high level alerts) to indicate varying proximity to the closest detected object.

The audible warning shall be generated through a standalone warning unit equipped with a piezoelectric buzzer to be mounted on top of the MDT or alternate location approved by the agency.

The warning unit shall be equipped with a light emitting diode (LED) which will flash along with audible warnings.

The audible warning shall stop once the bus comes to a full stop after driver applies the brakes.

10 Event Data Recorder System (EDRS)

10.1 General

The successful Contractor shall provide all software and hardware that comprise the EDRS, all upgrades to the software that would make it current and the required number of licenses for all users.

All software for user configuration, data logging, and downloading and report generation shall be Microsoft Windows-based.

The EDRS shall provide a continuous log of vehicle activity. Speed history, odometer, excessive RPM, heavy braking, and fast acceleration exceptions shall automatically be recorded by exception.

The EDRS shall also include an exception based video event recorder.

The video event recorder shall be mounted on the windshield behind the rearview mirror and shall capture sights and sounds inside and outside the vehicle.

The exact location of the mounted video event recorder shall be determined by the proposer and agency staff.

A three-axis accelerometer shall be provided to sense and log excessive movement in any direction. The EDRS shall be capable of measuring longitudinal, lateral and vertical "g" forces on the vehicle.

Accelerometers shall have an accuracy of 0.01g.

In the event of an accident, all data shall be permanently captured on a storage device onboard the vehicle. The storage device shall be tamperproof and shall have a minimum capacity of 16 mega bytes (MB). Captured data shall be uploaded to the central system via a wired or wireless connection.

Captured data, due to an incident, shall be for a minimum of (30) seconds prior to the incident and (30) seconds after the incident at a minimum interval of 25 milliseconds.

When the EDRS is triggered, a light shall blink to alert the driver. This is intended to let the driver associate an action he/she did to the recorder activation.

The EDRS will provide an automatic trigger function with different user definable thresholds for moving and stationary conditions.

All recorded data shall be date and time stamped.

A "tag button" shall be provided that allows the driver to manually tag accidents, incidents and vehicle fault conditions.

In the event the "tag button" is pressed, the EDRS shall capture data for a minimum of (30) seconds prior to when the button was pressed and (30) seconds after the button has been pressed. Data shall be captured at least every 25 milliseconds during this period.

The location of the "tag button" shall be determined by the Contractor and the agency's staff.

Additional digital input channels will be provided to allow for status monitoring of a minimum of six (6) vehicle sub-systems such as: brakes, lights, signals, flashers, driver's seat belt, wheelchair lift, engine temperature and front door.

Any data provided by the EDRS must be admissible in court.

Captured data shall be stored in Microsoft Access database.

All data shall be the property of the transit agency and shall be immediately available to the transit agency.

The Contractor must provide hardware specifically designed for the harsh transit environment. Equipment provided shall be designed to operate effectively throughout temperature extremes of from -30°C (30° below zero C) to +60°C, and to withstand the vibration and shock forces associated with transit vehicles. Equipment shall meet the requirements of this specification under all conditions encountered in transit operations. All in-vehicle equipment shall be housed in splash-and tamper-proof enclosures.

The on-board EDRS units shall be securely mounted in the interior of the vehicle, clear of obstructions and interference-generating devices. The location of the on-board units shall be determined in collaboration with the agency's staff.

The proposed EDRS shall operate from the vehicle electrical system, between 9 and 35 volts.

The Contractor shall provide appropriate in-vehicle equipment for all vehicles for each agency per Section 2 (Overview) and Table 2.

10.2 Reports

The system shall allow viewing and/or printing information detailed by item or summarized by groups.

EDRS shall provide the users with the capability to customize reports to suit each agency's specific needs.

The system shall provide capability to summarize data for departmental reporting requirements.

All reports shall use standard reporting tools (e.g., Crystal Reports or MS Access) and shall have the ability to export data into file formats that can be with a web browser or viewed and edited with standard office software (e.g., Microsoft Internet Explorer, Word and Excel versions used by the participating agency).

EDRS shall allow users to create graphical reports that include color-coded charts and graphs.

Default reports generated by the EDRS shall include, at a minimum, the following:

- Exception report

- Trip summary report

- Daily exception summary report

- Weekly exception summary report

- Monthly exception summary report

- Daily driver summary report

- Weekly driver summary report

- Monthly driver summary report

11 IVR-Based Scheduling System

11.1 General

The implementation of this system is intended to create an Interactive Voice Response (IVR) system that can be accessed by riders via public telephone numbers. The objective of this system is to provide the public with a means to automatically book a trip, and/or review/cancel booked trips.

The IVR shall be integrated with the agency's existing telephone system and the following systems:

- Client database

- Proposed scheduling and dispatch software.

The Proposer shall indicate how the IVR system will be compliant with the ADA Accessibility Guidelines and Limited English Proficiency requirements.

11.1.1 Existing Telephone System

OATS existing telephone systems are described below. Each of the seven regions has its own telephone system, with only the East Region and the Southwest Region having similar systems. The East Region telephone system is due to be replaced in spring 2008. The following are the details of each of the systems:

- East Region (St. Louis):

  o NEC Aspire Phone System (expected to be replaced by April 1, 2008)

  o 14 lines, 1 DSL, 1 Fax

  o 10 phones

- Home Office includes Mid-Mo Region(Columbia):

  o InterTel Phone System

  o 10 lines, 1 DSL, 2 Fax

  o 25 phones

- Southwest Region (Springfield)

  o NEC Aspire Phone System (1 year old)

  o 5 lines, 1 DSL, 1 Fax

- o   7 phones

- West Region (Harrisonville)

  - o   Toshiba Strata CTX

  - o   5 lines, 1 DSL, 1 Fax

  - o   7 phones

- Midwest Region (Sedalia)(expected to be replaced in 2008)

  - o   Unknown at this time

  - o   5 lines

  - o   8 phones

- Northeast Region (Shelbina)

  - o   Sprint Protégé 16

  - o   5 lines, 1 DSL, 1 Fax

  - o   6 phones

- Northwest Region (St. Joseph)

  - o   Unisyn

  - o   4 lines, 1 Fax

  - o   7 lines

11.1.2 Customer Interface

The customer interface shall consist of voice prompts to which the customer may respond by either voice commands or by phone touch-tone key selection.

The IVR system shall provide a welcoming message as its first response to incoming callers. The system shall also allow for an additional optional message to be spoken after the welcome message.

The IVR system shall be designed such that calls with "no touch-tone or voice response within a short period of time" (time-out) by the customer are acted upon automatically. Proposers shall specify proposed options for calls that time-out.

The voice prompts shall promote the utilization of automated transit information as a first choice over communication with a live representative.

The voice system structure shall provide key-ahead of touch-tone inputs such that experienced users do not have to wait for voice messages or prompts to complete prior to making a touch-tone or voice selection.

At any time during the call, the customer may request a transfer to Customer Service via touch-tone key or voice command. The touch-tone key used for the selection shall remain consistent throughout the customer interface.

11.1.3 Automated Trip Reservation

The spoken menus shall provide the callers with the ability to schedule their trips upon entering or saying their identification number. The system shall ask for the password for verification. Prior to using the IVR the customer would need to contact the agency to set up their password.

The system shall give the caller the option to enter or say the day, time, origin and destination of the trip to be scheduled.

The system shall allow the caller to enter or say the origin and destination in terms of street address, intersection, or landmark.

Upon the caller entering or saying the time and date, the IVR system shall confirm the validity of the date and time entered or say that the information is not valid after which the caller is prompted to re-enter the information. Upon the caller entering or saying the origin location, the IVR system shall confirm the presence of the origin location or say that the information is not valid after which the caller is prompted to re-enter the information. The system shall also offer the choice to specify whether the selected time is for departing the origin or arriving at the destination.

The system shall be capable of accepting trip bookings up to a set number of days in advance of the requested trip date for subscription trips and a set number of days of the requested trip date for regular trips, with these values configurable by the agency.

Upon the caller entering or saying the destination location, the IVR system shall confirm the presence of the destination location or say that the information is not valid after which the caller is prompted to re-enter the information.

Upon scheduling a trip, the IVR system shall confirm the trip by re-stating, to the caller, the scheduled trip information (i.e., name of customer, and origin, destination, date and time of trip, and required fare).

The IVR system shall also provide a confirmation number for a scheduled trip, so that the caller can write this number down for future use to easily reference this trip with customer service.

11.1.4 Automated Trip Review/Cancellation

After a caller enters or speaks their identification number and password, the IVR system shall retrieve all their already scheduled, but not completed, trips (regardless of the method used for scheduling the trip), and then will read the date, time, origin and destination of each trip back to the caller. The caller shall be prompted to cancel a trip as it is being read to them or after it is read back to them but before the next trip is read.

Conversely, a caller shall be given the option to enter or say the day, time, origin and destination of the trip to be canceled, or say the cancellation number provided as part of the IVR trip scheduling process. The IVR system shall confirm the presence of such trip or say that it is not a valid trip if the trip is not in the database.

Upon requesting to cancel a trip, the IVR system shall provide the caller with the option to proceed or not proceed with the cancellation.

Upon canceling a trip, the IVR system shall confirm the cancellation by re-stating, to the caller, the canceled trip information (i.e., name of customer, and origin, destination, date and time of canceled trip), and providing the customer a cancellation number for future reference as evidence of having cancelled the trip. Customers shall be able to cancel only trips assigned to them.

Upon canceling a trip, the IVR system shall update the customer's account information.

11.1.5 Automated Trip Notification

The system shall automatically call all clients that have opted to "subscribe" to this feature to remind them of their trips that are scheduled for the following day.

The system shall automatically call all clients that have opted to "subscribe" to this feature to notify them that the vehicle of their trip is within a specified distance and/or time (i.e. 2 miles and/or 15 minutes away).

When a reminder call is performed, the system shall provide the client, at a minimum, with their name, pick up location, and pick up time window.

11.1.6 Smart Card Updates

The IVR shall provide the callers with the ability to accessing and updating smart card account information.

The smart card account information prompt shall enable customers to check their smart card account balance, or make a credit card payment to increase this balance.

The smart card prompts shall allow users to enter (by speaking and/or touch tones) the amount to be added to the card, and information required to complete a credit card payment authorization (e.g., credit card number, cardholder name, expiration date of credit card, security code of credit card).

The smart card prompts shall read to the user the current stored value for the card.

The smart card prompts shall provide the user with the option to increase the card stored value balance.

After entering all required information to add value to the card, the application shall request the user to confirm their request before proceeding with the completion of the transaction.

The application shall provide the user with the option to cancel the transaction at any time up until before confirming their transaction.

Once a transaction is confirmed, the application shall process the transaction by charging the user's credit card the amount entered by the user.

Once the transaction is processed successfully, the application shall read to the user the confirmation number; otherwise, the application shall read to the user the reason as why the transaction failed (i.e. insufficient funds, invalid credit number, could not make connection, etc...).

The smart card update IVR application shall include the interface with the merchant acquirer of the agency to complete real-time credit authorizations for at least Visa and Mastercard.

11.1.7 Call Volume and Call Transfers

The proposed system shall handle at least ten thousand (10,000) calls per day.

The proposed IVR system shall accommodate call transfers to customer service and at least seven other telephone numbers.

When a transfer request to Customer Service is initiated by a caller after business hours, the IVR system shall provide an informational message to the caller and then return the caller to the first level of the IVR system voice menu.

When a transfer request to Customer Service is initiated by the caller during regular business hours, the IVR system shall transfer the caller to Customer Service if a call taker or queue space is available.

When a transfer request to Customer Service is initiated by the caller during regular business hours but when call takers are busy and the queue is full, the IVR system shall detect the queue-busy condition, hold the call, announce the approximate amount of time the caller may be on hold and provide IVR menu options for automated assistance.

11.1.8 Administrator Interface

The IVR system shall provide system administration functions sufficient to manage the required functionality, including the ability to select passwords for customers. Proposers shall provide sample screen shots and a high-level diagram of major menu options and administrative tools provided as part of the proposed IVR system.

The appropriate security shall be in place to manage access to the system, including the following:

- Support for multiple security and access levels; and

- Applying different security levels to specific users.

Functions for editing, similar to those found in most Windows applications, shall be provided. These functions include drop down, fast-key, and "right-click" selections for cut, copy, paste, find, replace, delete and other often-used functions.

11.1.9 Usage Data Collection and Reporting

The IVR system shall collect customer call data and provide reports for administrative purposes. Proposers shall describe the level to which data may be collected for incoming customer calls and for the touch-tone responses to menu options.

The proposed system shall allow a system administrator to generate reports for specific time periods, including the following types of reports:

- Number of total incoming calls;

- Number of calls that transfer to Customer Service without other input;

- Number of calls that transfer to Customer Service with other input;

- Number of calls that request to cancel a scheduled trip;

- Total number of smart card page access;

- Total number of smart cards updates;

- Specifics of each smart card update—including smart card number, original value, cash amount added to card, last 4-digits of the credit card number used and its expiration date, updated value of smart card after transaction;

- Total amount of cash added to smart cards; and

- Call duration.

The proposed IVR shall allow the system administrator the capability to generate the above reports by the following selectable periods:

- Hourly;

- Daily;

- Range of days;

- Weekly;

- Weekend; and

- Weekday.

11.1.10   Vocabulary Management

The proposed IVR system shall provide the capability for the system administrator to record and edit vocabulary words, and construct the phrases that will be used by the IVR system.

Proposers shall specify the method(s) for recording and editing vocabulary words, and constructing phrases.

The proposed IVR system shall provide speech editing features. Proposers shall specify features supported by the vocabulary management environment, including but not limited to:

- Individual vocabulary edits;

- Pause deletions and insertion; and

- Undo/redo individual vocabulary edits.

The IVR system shall provide the capability to store and manage all vocabulary words and phrases used by the system. Proposers shall describe how the vocabulary words and phrases are to be stored and managed.

11.2 Integration

11.2.1 Paratransit Scheduling Software

The IVR system shall be integrated with the scheduling software for performing the following functions:

- Customer registration;

- Trip booking; and

- Trip review/cancellation.

11.2.2 Client Database

The IVR system shall be integrated with the client database in order to update the database with modification to the customer account or trip information.

12 Web-Based Scheduling System

12.1 General

The enhancement of the agency website is required to provide applications that can be accessed by riders via the Internet. The objective of these applications is to provide the capability for a customer to (1) register as a web-based user; (2) book a trip, (3) review, cancel or modify a previously booked trip, and (4) review/modify customer smart card information (including accepting credit card payments to add to the stored value balance).

The Contractor shall be responsible for supplying the necessary software, technical support, and warranty coverage for the website enhancement.

The Proposer shall indicate how the web-based system will be compliant with the ADA Accessibility Guidelines and Limited English Proficiency requirements.

While customers are logged onto the site, their interactions with the web server shall be secured and encrypted, using at minimum Secure Sockets layer (SSL) technology.

12.2 Web-based reservations

12.2.1 General Customer Interface Requirements

The agency website homepage shall contain a hyperlink to the web-based reservations page.

The web-based reservations page shall contain a hyperlink to the homepage of the agency.

The reservations pages shall contain general information regarding agency operations and the use of the web-based reservations application.

The reservations pages shall enable the customer to reserve, modify or cancel a trip, as well as review or print trip details.

The reservations pages shall be configure to display well on several popular web browsers, including at minimum Internet Explorer 5, 6 or 7 as well as on Mozilla Firefox 1 or 2.

12.2.2 Client Registration

All new customers will be asked to register first before being able to reserve a trip using the web interface.

The registration module shall ask customers for all the information needed by the scheduling software for client registration. This shall include the ability for the agency to define up to ten additional client registration fields to gather additional data requirements (e.g., additional client information required by particular funding sources).

The registration module shall clearly indicate which information is needed by the central software for registration (e.g., name, home address, and phone number).

There shall be the option as part of the client registration to provide an email address for receiving email confirmations and receipts.

Additional optional fields shall be included to allow for additional information that could speed the online trip booking process, including default pickuo address, alternate common pickup addresses, common destination addresses (as well as the option to name how these would be displayed on the trip booking screen).

The registration module shall have command buttons for the following actions:

- The "RESET" button shall refresh the screen in order to restart the registration process; and

- The "SUBMIT" button shall send the information input by the customer to the central software. The registration module shall confirm the information input by the customer before submission.

If the client is already registered with the agency, and is registering only to extend their account to include web registration capabilities, the website shall allow the customer to enter their existing client ID number. In this case, the website shall retrieve all the required registration data for that customer from the scheduling software and automatically complete the website registration process.

The registration module shall show a confirmation screen when a successful registration is completed and a customer account is created, including the assigned client ID (or the existing customer account has been extended to include web registration).

The confirmation screen shall allow the customer to create a password for use in accessing the site together with their client ID, as well as a password reminder question/answer for use to allow access to their password in case it is forgotten.

The registration module shall display an error screen when the registration cannot be completed. The error screen shall recommend an appropriate action to be taken by the customer. For example, the customer may need to re-enter the information in the case that there was an invalid data entry (e.g., date format, not recognized by the software). Another example would be to tell the customer to call customer service or try again later if the registration server is down).

Customers shall be allowed to modify their account details later on, if needed, including their password, password reminder question/answer, and notification email address.

12.2.3 Trip Booking

The application shall provide customers with the ability to schedule their trips upon entering their client ID. The system shall ask for the password for verification.

The application shall automatically populate the trip booking page using the details from the customer profile including the default pickup address. The application will allow the customer to enter an alternate pickup and dropoff locations in the form of a street address, street intersection or a landmark and will have a map interface for assistance. Additionally, the customers will have the option of choosing both pickup and dropoff locations from the list of predefined favorites.

The map interface shall allow the user to enter an address by simply clicking on the location at the map. The application shall automatically fill in the street address based on the location selected by the user from the map.

The application shall ask the customer to enter the date and time for the trip, with the choice to select either the pickup or dropoff time. The trip date shall be entered using a pop-up interactive calendar interface. The system shall be capable of accepting trip bookings up to a set number of days in advance of the requested trip date for subscription trips and a set number of days of the requested trip date for regular trips, with these values configurable by the agency.

Upon the customer entering the date and time, the software shall confirm the validity of the date and time entered. The software will ask the customer to re-enter the information if the data entered is invalid.

Pick-up time negotiation requirement, for use only with ADA service, is no more than one hour before or after the client's desired departure time. The system shall require entry of a requested pick-up time and allow entry of a negotiated pick-up time within the limits of this window.

The application shall ask the customer for the number of travelers in their party. The system shall allow the customer to designate a trip for a group booking (e.g., a trip for a group of two or more individuals traveling to a common destination that will be scheduled to the same run), and then add or delete individual clients from the group booking. Client information from these additional clients being added to the trip shall be retrieved from the scheduling and dispatch software in real-time.

Customers will be asked to enter the information about any traveling children or an accompanying Personal Care Attendant (PCA), who will be guaranteed to be on the same vehicle. Both children and PCA will not be charged any fare.

If the selected trip date is within the customer's suspended ridership privileges time period, the system shall alert the customer that the trip booking cannot be completed for this reason. These dates shall be entered using a pop-up interactive calendar interface.

Once all other trip booking information has been entered, the system shall indicate to the customer any applicable fare(s) to be paid by the customer and any companions.

The system shall, at the conclusion of the trip booking process, confirm to the customer that the booking was successfully entered into the system, providing a confirmation number and the option to receive a confirmation email to the email address defined through the client registration module.

12.2.4 Trip Review/Modification/Cancellation

The application shall allow the customer to retrieve their scheduled trips once their client ID is verified. The system shall ask for the password for verification. The application shall retrieve their already scheduled, but not completed, trips, and then display the date, time, origin and destination, and the required fare of each trip.

The system shall allow the customer to select and edit existing trip bookings to modify the pick-up address, drop-off address, trip date, and/or pick-up time. The system shall assign a unique identification number to each trip booking record to associate with the modified trip and records will be modified in the client database. Upon modifying a trip, the application shall confirm the modification, providing a modification number and the option to receive a modification confirmation email to the email address defined through the client registration module.

The system shall permit cancellation of any trip booking, when consistent with transit agency policies. The system shall retain the trip booking and flag it with the date and time when it was cancelled to facilitate transit agencies' management of its cancellation policies.

Upon requesting to cancel a trip, the application shall provide the user with the option to proceed or not proceed with the cancellation. Upon canceling a trip, the application shall confirm the cancellation, providing a cancellation number and the option to receive a cancellation confirmation email to the email address defined through the client registration module. Customers shall be able to cancel only trips assigned to them.

12.3 Smart Card Updates

The web-based reservations page shall contain a page for accessing and updating smart card account information.

The smart card account information page shall enable customers to check their smart card account balance, or make a credit card payment to increase this balance.

The smart card page shall include fields to enter the amount to be added to the card, and information required to complete a credit card payment authorization (e.g., credit card number, cardholder name, expiration date of credit card, security code of credit card).

The smart card page shall display the current stored value for the card.

The smart card page shall provide the user with the option to increase the card stored value balance.

After entering all required information to add value to the card, the application shall request the user to confirm their request before proceeding with the completion of the transaction.

The application shall provide the user with the option to cancel the transaction at any time up until before confirming their transaction.

Once a transaction is confirmed, the application shall process the transaction by charging the user's credit card the amount entered by the user.

Once the transaction is processed successfully, the application shall provide the user with a confirmation number and the option to receive a confirmation and receipt email to the email address defined through the client registration module; otherwise, the application shall provide the user with a statement on why the transaction failed (e.g., insufficient funds, invalid credit number, could not make connection).

The smart card update web application shall include the interface with the merchant acquirer of the agency to complete real-time credit authorizations for at least Visa, Mastercard and Discover cards.

12.4 Administrative Interface

The website shall provide system administrative functions to manage various aspects of the system. Proposers shall provide a high-level diagram of proposed major menu items and administrative tools to be provided as part of web based applications.

The appropriate security shall be in place to manage access to the system, including the following:

- Support for multiple security and access levels; and

- Applying different security levels to specific users.

Functions for editing, similar to those found in most Windows applications, shall be provided. These functions include drop down, fast-key, and "right-click" selections for cut, copy, paste, find, replace, delete and other often-used functions.

12.5 Usage Data Collection and Reporting

The application shall collect website usage data and provide reports for administrative purposes. Proposers shall describe the level to which data may be collected from the agency website for proposed web based applications.

The system shall allow a system administrator to generate reports for specific time periods, including the following types of reports:

- Total number of web page accesses;

- Total number of errors encountered during accessing the website;

- Total number of reservation requests;

- Total number of trip planning requests;

- Total number of requests to modify or cancel a scheduled trip;

- Total number of smart card page access;

- Total number of smart cards updates;

- Specifics of each smart card update—including smart card number, original value, cash amount added to card, last 4-digits of the credit card number used and its expiration date, updated value of smart card after transaction;

- Total amount of cash added to smart cards; and

- Total number of incomplete requests where customers quit before completing a function (e.g., an incomplete request for trip booking where the customer cancels the transaction or exits the transaction before completing the reservation);

The application shall allow the system administrator to generate the above reports by the following selectable periods:

- Hourly;

- Daily;

- Range of hours/days;

- Weekly;

- Weekend; and

- Weekday.

12.6 Integration

12.6.1 Paratransit Scheduling Software

The web based reservations application shall be integrated with the scheduling software for performing the following functions:

- Customer registration;

- Trip booking; and

- Trip modification and cancellation.

12.6.2 Client Database

The web based reservations application shall be integrated with the client database in order to update the database with modifications to the customer account or trip information.

13 Project Management

13.1 General

The Contractor shall, for all deliverables, include the filename in the document footer and include in the filename the file release date.

The Contractor shall prepare all deliverables in both Microsoft Office (Word, Excel or PowerPoint versions used by the participating agency) and Adobe PDF formats, with MoDOT and the deploying agency granted full rights to reprint as needed.

13.2 Project Status Tracking

The Contractor shall prepare a System Implementation Plan (SIP), including the detailed implementation activities/schedule, progress milestones/status and assigned staff.

The Contractor shall also include a Safety Management Plan in their SIP, which shall detail their responsibilities and procedures for safety during the different phases of the project, including (1) conducting pre-installation surveys to identify potential project safety hazards; (2) identifying project hazard control procedures, including occupational (worker) and public hazards; (3) providing project safety orientation and training to its subcontractors and the transit agency staff who will be involved in the project; and (4) furnishing procedures and training for project accident reporting and investigations,

The initial draft of the SIP shall be provided to the deploying agency within two weeks from Notice to Proceed (NTP).

The revised SIP, addressing comments from the first onsite meeting, shall be provided to the deploying agency within two weeks after this meeting.

The SIP must be approved and accepted by the deploying agency before it can become effective.

An updated SIP shall be submitted to the deploying agency at the beginning of each month.

The Contractor shall maintain an Action Items List (AIL), indicating for each item the following: (1) item number; (2) date generated; (3) brief item descriptive title; (4) assigned person with lead resolution responsibility; (5) date resolved; and (6) ongoing dated notes on resolution status.

The AIL shall be sorted, primarily by unresolved vs. resolved items and secondarily by the date the item was generated.

13.3 Management Documentation Requirements

The Contractor shall follow project management standards established by MoDOT and the deploying agency for items including, for example, agendas, status reports and SIPs.

13.4 Bi-Weekly Conference Calls

The Contractor shall participate in bi-weekly conference calls with the deploying agency Project Manager, other agency staff, MoDOT Transit Section project representative, and outside consultants as determined by the deploying agency Project Manager.

The agenda for these meetings will be to discuss the most current status of and plans related to all issues identified in the recent releases of the SIP and AIL.

The deploying agency reserves the right to identify for discussion any additional issues beyond those in the SIP and AIL.

A status report shall be issued to the deploying agency and MoDOT Transit Section project representative at least two days prior to each conference call, including (1) an agenda for the upcoming conference call highlighting key discussion items; and (2) an updated AIL with the updates incorporating the discussions of the previous bi-weekly conference call as well as other subsequent developments since the previous AIL release.

The Contractor shall be represented in these conference calls by at minimum their Project Manager, as well as any additional Contractor staff necessary to properly address the current issues and project status.

The deploying agency will be represented by their designated implementation management representatives.

Conference call facilities will be arranged and paid for by the Contractor.

The Contractor shall submit minutes within two days of each conference call.

13.5 Minimum Required Onsite Work

At the first onsite meeting, the Contractor shall be prepared to discuss the deploying agency's feedback on draft SIP and conduct Requirements Review.

At the second onsite meeting, the Contractor shall be prepared to discuss the deploying agency's feedback on draft Design Review documentation.

During the third onsite effort, the Contractor shall install system and conduct acceptance testing. These onsite installation and testing efforts will occur over an extended period, and will likely involve several different onsite trips and a range of different Contractor staff.

13.6 Invoicing

The Contractor shall only submit an invoice once a fully-signed Acceptance Certificate is generated by the deploying agency indicating that a progress payment milestone has been achieved. MoDOT and the deploying agency will withhold 10% retainage on each invoice. Upon acceptance by the deploying agency of each phase of the project, the total retainage for that phase will be paid to the Contractor

14 Design Review

The Contractor shall participate in the Requirements Review (RR), as part of the first onsite meeting. The RR meeting shall discuss, for each contract requirement, the following: (1) the deploying agency design intent; (2) the intended Contractor design approach; and (3) the general Contractor approach to demonstration through the acceptance testing process.

The Contractor shall submit draft Design Review Documentation (DRD) within four weeks of the RR meeting.

The DRD shall include the following materials: (1) an overview of the equipment, system and configuration proposed for implementation; (2) detailed technical documentation for each equipment item; (3) detailed technical documentation on all software, addressing the functions of each module, the format of all user interface screens, the format of all reports, the data fields to be included in all data exchange interfaces and any other software aspects warranting advance agreement with the deploying agency prior to system customization/configuration; and (4) a table detailing the approach taken in the design to address each individual contract requirement (subsequently referred to as the Requirements Matrix (RM)).

The Contractor shall prepare all deliverables in both Microsoft Office (Word, Excel or PowerPoint versions used by the participating agency) and Adobe PDF formats, with the deploying agency granted full rights to reprint as needed.

The Contractor shall for all deliverables include the filename in the document footer and include in the filename the file release date.

The second onsite meeting will include discussions with the deploying agency on their feedback on the DRD, and shall occur within four weeks after the draft DRD has been submitted.

The Contractor shall submit the updated DRD within three weeks of the second onsite meeting.

The DRD is intended only to reduce the chance of any misunderstandings on the design intent or interpretation of the contract requirements. The DRD shall not alter the need for the successful formal demonstration of each requirement through the Acceptance Testing process .

15 General Installation Requirements

Installations shall be performed at any time during the day and as approved by each agency. Contractor may be required by the agencies to perform installations over nights and weekends, and installations may need to be performed at the implementing agency's home base (agency headquarters, or OATS regional office).

The Contractor shall install and configure the entire system, including the deploying agency-provided computer hardware and integration with existing systems.

The Contractor shall provide all necessary personnel, tools, test equipment, transportation, hardware and supplies for the successful and complete installation of all equipment and software.

The Contractor shall be responsible for their own and subcontractors' performance and safety.

Installations shall be performed in accordance with all Federal, State and Local laws and regulations.

The Contractor shall supply any electrical equipment necessary to operate system components using existing DC electrical power available on the deploying agency vehicles and existing AC electrical power at fixed facilities. If existing power arrangements are unsatisfactory, the Contractor must specify proposed alterations in advance.

The Contractor shall submit Installation Design Documentation (IDD), for deploying agency approval prior to undertaking any installations.

The IDD shall provide text, drawings, illustrations and images using adequate detail to allow for quality installation by a technician without further training in conjunction with other installation instructions provided by the vendors of individual equipment components.

The IDD shall include details on (1) equipment installation locations/mounting; (2) routing, conductors, color-coding, labeling, and connectors for power, communications and vehicle ground circuits; (3) connections with, any required modifications to and restoration of existing infrastructure; (4) work area and equipment storage requirements (5) methods and quality standards; and (5) supervision and quality assurance procedures.

The deploying agency reserves the right to allow no more than 10% of its vehicle fleet to be out of service within any given 24 hour period to accommodate vehicle installations.

The deploying agency also reserves the right to when necessary allow less of its vehicle fleet to be out of service if needed in order to avoid disruption to revenue service requirements in conjunction with maintenance requirements.

The Contractor shall ensure that all vehicles made available for overnight installation work are ready for revenue service by the start of the next day.

The capabilities of existing infrastructure affected by or to be integrated into the new system, such as the deploying agency's LAN, WAN and WLAN facilities, shall not be reduced at any time by system implementation.

The Contractor shall only be authorized to undertake installations after the deploying agency approval of a pre-installation inspection for each installation site, documenting the existing condition of any existing infrastructure that may be affected by the installation.

All spare components must be delivered before each deploying agency will allow equipment installation.

After installations, the Contractor shall be responsible for restoring the condition of any affected existing infrastructure at the installation sites to their pre-installation condition.

The Contractor shall be responsible for the security of equipment prior to installation. The deploying agency will provide space for the Contractor to establish secure storage facilities adjacent to each installation area.

The deploying agency will provide space for central system installations and vehicle installations.

The deploying agency will provide light and electrical service at all installation locations.

The deploying agency will provide sufficient staff to move vehicles to and from the installation locations.

The deploying agency will complete agreed modifications to existing infrastructure required to support the installations.

The Contractor shall prepare all deliverables in both Microsoft Office (Word, Excel or PowerPoint versions used by the participating agency) and Adobe PDF formats, with the deploying agency granted full rights to reprint as needed.

The Contractor shall for all deliverables include the filename in the document footer and include in the filename the file release date.

16 Acceptance Testing

The Contractor shall submit an Acceptance Test Procedures document (ATP), for deploying agency approval prior to undertaking any testing.

The ATP shall clearly address: (1) how each testable specification requirement will be demonstrated, including the method for performing the test; (2) the results that will constitute success for each test; (3) responsibilities of both Contractor and the deploying agency's representatives during each test; and (4) a cross-reference to which contract requirements from the RM are being addressed by each test procedure.

The ATP shall include an updated RM from the DRD, to include the test stage at which each contract requirement will be demonstrated; and a cross-reference to the test procedure(s) that serve to address each contract requirement.

The Contractor shall prepare all deliverables in both Microsoft Office (Word, Excel or PowerPoint versions used by the participating agency) and Adobe PDF formats, with the deploying agency granted full rights to reprint as needed.

The Contractor shall for all deliverables include the filename in the document footer and include in the filename the file release date.

The ATP shall be submitted to the deploying agency at least three weeks in advance of any intended testing.

The ATP shall incorporate the following distinct testing stages for each deployment stage: (1) Factory Testing (FT); (2) Installation Testing (IT); (3) System Testing (ST); and (4) Burn-In Testing (BT).

FT shall be completed before the equipment and software is shipped to the deploying agency for installation, and deficiencies shall be rectified before shipping to the deploying agency for installation.

FT shall be witnessed by the deploying agency's representatives (deploying agency staff and/or designated support consultants).

IT shall be completed after each installation, and deficiencies shall be rectified before the initiation of ST.

IT may be witnessed by deploying agency representatives.

ST shall be completed after the entire system for each deployment stage has been installed, and deficiencies shall be rectified before the initiation of BT.

ST shall include the testing of all spare components.

ST shall be witnessed by deploying agency representatives.

BT shall involve revenue service use of the system over a 30-day period after the completion of ST for each deployment stage, and deficiencies shall be rectified before the deploying agency will grant System Acceptance (SA) for that deployment stage.

The deploying agency may authorize the Contractor to proceed to the next testing stage with certain deficiencies not yet resolved.

The Contractor shall provide written notice to the deploying agency at least five days in advance of any testing, indicating the specific tests to be completed as well as the date, time and location.

The Contractor shall be required to reschedule testing if the deploying agency witnessing representatives cannot be present or if other circumstances prevent testing from taking place.

The Contractor shall provide written Test Results Documentation (TRD) within one week of completing each stage of testing.

The TRD shall document the results of each ATP procedure and provide an updated RM that indicates which contract requirements have been demonstrated.

The TRD must be approved before the deploying agency will grant SA for a deployment stage.

SA will not be granted for a deployment stage until all contract requirements have formally demonstrated through AT.

The RM shall be used as a "punch list" to track which requirements have not yet been demonstrated at each stage of testing.

A requirement classified as having been "demonstrated" during a certain AT stage can be subsequently redefined as having been "not demonstrated" if compliance issues emerge prior to SA

17 Documentation and Training

17.1 General

The Contractor shall prepare all deliverables in both Microsoft Office (Word, Excel or PowerPoint versions used by the participating agency) and Adobe PDF formats, with the deploying agency granted full rights to reprint as needed.

The Contractor shall for all deliverables include the filename in the document footer and include in the filename the file release date.

All documentation and training must be completed before the deploying agency will allow equipment installation.

17.2 Training

The Contractor shall provide training courses for at least:

- Equipment installers/maintainers;

- Trainers for paratransit vehicle operators;

- Users of the paratransit scheduling/dispatch software;

- Users of the CAD/AVL software;

- Customer service staff; and

- Applications/systems administrators.

The actual number of each of above categories of trainees will be provided by individual agencies.

The Contractor shall provide all training materials in both Microsoft Office and Adobe PDF formats, compatible with the versions in use by the participating agency, on compact disc (CD) or digital videodisc (DVD) with a permission to reproduce copies later on.

The Training Plan (TP), including the training schedule and course outlines, must be provided to the deploying agency for review at least three weeks in advance of the start of training.

The TP must be approved by the deploying agency before the start of training.

The Contractor shall furnish all special tools, equipment, training aids, and any other materials required to train course participants, for use during training courses only.

The instructors shall demonstrate a thorough knowledge of the material covered in the courses, familiarity with the training materials used in the courses, and the ability to effectively lead students in a classroom setting.

If any instructor is considered unsuitable by the deploying agency, either before or during the training, the Contractor shall provide a suitable replacement within five business days of receiving such notice from the deploying agency.

The Contractor shall provide brief refresher versions of each training course to the original trainees between three to six months after SA for each deployment stage at no additional cost.

The Contractor shall provide additional training to the original trainees after SA for each deployment stage at no additional cost if major modifications are made to the system after the initial training due to system upgrades or changes made under warranty; and/or SA occurs at least three months after the completion of training, due to delays for which the Contractor is responsible.

17.3 Manuals

The Contractor shall provide an As-Built Document (ABD) to the deploying agency at the completion of each deployment stage.

The Contractor shall provide all manuals in both Microsoft Office and Adobe PDF formats, compatible with the versions in use by the participating agency, on CD or DVD with a permission to reproduce copies later on.

The ABD shall include: (1) an inventory of all components supplied including supplier, model number, serial number and installation location; (2) an inventory of all spare parts supplied including supplier, model number, serial number and storage location; (3) all reference and user manuals for system components, including those components supplied by third parties; (4) all warranties documentation, including that for components supplied by third parties; (5) a diagram indicating the as-built interconnections between components; and (6) the version number of all software, including that supplied by third parties.

The Contractor shall provide Maintenance Manuals (MM) documenting (1) how the system components were installed; (2) how to install and configure spare components; and (3) the schedule/procedures for preventative maintenance, inspection, fault diagnosis, component replacement and warranty administration on each system component.

The Contractor shall provide User Manuals (UM) for the paratransit and fixed route dispatchers, documenting use of all functions of the software.

The Contractor shall provide Vehicle Operator Manuals (OM) for paratransit and fixed route documenting use of the MDTs and on-board equipment.

The Contractor shall provide a Systems Manuals (SM), documenting (1) the configuration and topology of central systems hardware and software; (2) central systems software functions and operations; (3) scheduled maintenance required for the central systems; and (4) database structure and data dictionary.

18 Maintenance and Warranty

18.1 Maintenance

18.1.1 Spare Components

The Contractor shall provide an initial supply of spare components to the deploying agency for all installed hardware (e.g., MDT and data modem), with a quantity of at least 15% of the installed quantity (with a minimum quantity of 1).

The proposal shall include a list of the spare components and quantities to be provided, including manufacturer and model numbers.

Storage provisions, such as shelving, bins or racks, for the spare components shall be included, and the components shall be delivered to the deploying agency already organized and labeled such that they can be readily identified and found. The storage provisions, organization and labeling must be approved by the deploying agency's Project Manager.

Spare components shall be packaged to protect their reliability, including providing for them to be identified, inspected, stored for long periods, and endure multiple inventories without damage or degradation.

At any time during the warranty period, the deploying agency shall have the option to purchase additional spare components. The price proposal shall include the price for the deploying agency optional purchase of each spare component.

These additional spare components shall be packaged, organized and labeled in the same manner as the original supply of spare components, although additional storage provisions will not need to be provided. These additional spare components will also be covered by the warranty.

18.1.2 Support

Software support during the warranty period shall include technical support for all hardware and software as well as providing, licensing, installing and integrating all released software patches and updates.

The Contractor shall arrange for support from one or more qualified firms to be available on a four-hour response basis, when needed by the deploying agency to assist with fault diagnosis or component replacement.

The proposal shall include a list of the support firms, their support responsibilities and the response arrangements.

If a support firm does not respond within the agreed response timeframe, or when a support firm is not able to provide the needed support, the Contractor shall provide during the warranty period supplementary support in accordance with an agreed escalation procedure. The escalation procedure can initially involve telephone support, but must culminate in the Contractor providing on-site support if needed. The proposal must define the proposed support escalation procedure.

18.2 Warranty

The warranty period for each deployment stage shall run concurrently for all system components, from their date of installation through to two years from the date of SA.

The Contractor shall offer an option to extend the warranty period for each deployment stage for one, two or three additional years. The Contractor shall document any differences in the warranty terms for these option years in their proposal.

The Contractor shall warrant that it has reviewed and evaluated all information furnished by the deploying agency and has made all inquiries necessary such that the Contractor is fully aware of the deploying agency's business requirements and intended uses of system, as set forth or referenced in the Request for Proposals and any Addenda, Amendments or Final Proposal Requests, as well as in discussions during the Pre-proposal Conference.

The Contractor shall warrant that the system satisfies the foregoing requirements in all material respects and will be fit for such intended uses.

The Contractor shall warrant that the design, materials, construction, software and workmanship of the equipment shall reflect the intended use of the equipment as a component of the overall transit management system in the deploying agency environment.

The Contractor shall warrant that equipment and software, including the initial supply of spare components, (1) are free from defects in design, material and workmanship, and shall remain in good working order, and (2) function properly and in conformity with this Contract.

The Contractor shall warrant that the documentation provided shall completely and accurately reflect the operation and maintenance of the equipment and software, and provide the deploying agency with all information necessary to maintain the system.

If there is a change in the production configuration of any equipment or software being installed prior to SA, the deploying agency may require that all previously installed equipment and software be upgraded to match the updated configuration.

The Contractor shall warrant compliance with all applicable laws and regulations relating to the project.

The Contractor shall warrant that its employees, agents and Subcontractors assigned to perform services under this contract shall have the proper skill, training and background to perform in a competent and professional manner and that all work will be so performed.

During the warranty period, the Contractor shall, at no cost to the deploying agency, furnish such materials, labor, equipment, software, documentation, services and incidentals as are necessary to maintain the system in accordance with the warranty.

The Contractor shall provide any software upgrades, fixes, updates, or version changes at no cost to the deploying agency during the warranty period.

In addition to the foregoing warranties, the Contractor shall assign to the deploying agency, and the deploying agency shall have the benefit of, any and all Subcontractors', Suppliers', and Vendors' warranties and representations with respect to the deliverables provided.

In its agreements with Subcontractors, Suppliers and Vendors, the Contractor shall require that such parties (1) consent to the assignment of such warranties and representations to the deploying agency; (2) agree that such warranties and representations shall be enforceable by the deploying agency in its own name; and (3) furnish documentation on the applicable warranties to the deploying agency.

The Contractor shall provide a single point of contact for all warranty administration during the warranty period.

The Contractor shall warrant that the deploying agency shall acquire permanent title to all equipment and non-proprietary software provided under the Contract, free and clear of all liens and encumbrances.

18.2.1 Repair or Replacement of Faulty Components

During the warranty period, the Contractor shall repair or replace any faulty components, with the cost included in the warranty price. The deploying agency will ship each faulty component to the Contractor, who shall return a new or repaired component within one week of originally receiving it.

If the Contractor determines that a returned component is not faulty, the deploying agency shall receive the original component back in working order within two days of the Contractor originally receiving the returned component.

All components received back at the deploying agency from the Contractor will be tested in accordance with the original ATP, and returned to the Contractor if faulty accompanied by a certification.

The Contractor shall pay all shipping charges to and from the deploying agency, and any duties associated with the repair or replacement of faulty units.

Returned or replaced spare components shall be packaged, organized and labeled in the same manner as the original supply of spare components.

18.2.2 System-wide Replacement

If at least 25% of a given component requires repair or replacement within the two-year warranty period, the component shall be deemed to warrant system-wide replacement.

System-wide replacement shall require the Contractor to replace all units of the suspect component throughout the system, whether or not they have exhibited any fault.

Even if the system-wide replacement activity extends beyond the end of the two-year warranty period, the Contractor shall be obligated to complete it if the need was documented before the end of the warranty period.